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'THE WEEKLY EXHIBITION RECORD.'

THE WEEKLY EXHIBITION RECORD—a temporary weekly supplement of the SANITARY RECORD—contains full accounts, profusely illustrated, of the exhibits in the Health Division of the International Health Exhibition, and the principal papers read at the Sanitary Conferences organised by the Society of Medical Officers of Health, the Sanitary Institute of Great Britain, the Parkes Museum of Hygiene, the Social Science Association, and the National Health Society. The EXHIBITION RECORD is at present being published weekly, price 2*d.* to Non-subscribers, free to Subscribers. The first Number was published on May 7, and will be continued till the work of description has been adequately carried out. Publishers: Smith, Elder, & Co., 15 Waterloo Place, S.W., London.

INDEX TO VOLUME V.

(NEW SERIES.)

Abatement of nuisances, 472
——— ——— smoke, 181, 201, 596, 591
Aberdeen, public park for, 232
Academy of Medicine (Ireland) Public Health, 452, 599
Accident to sewer, action, 87
Accidents from lifts, 367
——— liability to, action, 87
Actions:—
A dilatory local board, 463
Bird *v.* Lord Greville, infectious disease and furnished houses, 605
Condensed milk, prosecution, 607
Disinfection, neglect of, 86
Frying fish a nuisance, 372
How to proceed with unhealthy dwellings, 372
Insanitary houses, 607
Liability of local authorities, 372
Lusher *v.* Gibbs, carpet-beating a nuisance, 606
Nuisance, neglect to obey magistrate's order, 87
Smoke abatement, 86
Supplying adulterated milk to workhouse, 627
Taking the cream off, 281
The Lea Conservancy Board *v.* the Mayor of Hertford and others, 605
Unwholesome food, 608
Water companies' charges, 373
Act, new patents and trade marks, 297
——— Public Health, alleged breach of, 464
——— Rivers Pollution, 588
Acts of Parliament, new, 116
Adams' (Dr.) Disinfecting Chamber, 216
——— on disinfection by heat, 202
——— gas-heating and cooking apparatus, 216
——— (R.) exhibits at Bristol Exhibition, 316
——— ——— Building Trades Exhibition, 511
Adolescents, effect of Education Act on the health of, 613
Adulterated milk, 627
Adulteration of bread, action, 507
——— butter and milk, action, 464
——— food, 459
——— ——— law in respect to, 373
——— milk, 21
——— ——— ——— at Birmingham, 550
——— ——— cost of, 501
Adulterators, a new way with, 257
Æolus Water Spray and Ventilating Company, 216, 558, 568
Air as a sanitary agent, by Dr. Angus Smith, 154
——— injector and downcast ventilator, Low's, 369
——— propeller, the 'Blackman,' 277
——— power, compressed, 611
Albion Concrete Company, 508
Albo-carbon light, 643
Albrecht, Mr., on German stoves and English fireplaces, 328
Alcohol in bread, 356
Aldous's ventilators, 509
Alfieri's vegetable disincrustator, 29
Alkali, &c., Regulations Act, 312
Allan and Adamson's gas stove, 216
Allen and Son's sick-room appliances, 231
Alnwick water supply, 524
Aluminium Crown Metal Company, 218
Ambulance car for Newcastle, 142, 227
America, avenues and boulevards in, 260
——— ——— hygiene of schools in, 104
American butter, 409
——— ——— ——— and milk, 553
——— ——— cities, water supply in, 17
——— ——— colleges, hygienic instruction in, 426
——— ——— patents (illustrated), 36, 82, 138, 275, 604
——— ——— pork, 555
——— ——— prisons and hospitals, 540
——— ——— Public Health Association, 146
——— ——— smokeless furnace, 276
Amersham Guardians and Rural Sanitary Authority, 30
Amsterdam Exhibition, 27; awards, 269
Analysis of water by Medical Officer of Health, 46
Anæsthetisation of animals before slaughter, 596
Angell's syphon trap, &c., 209
Animals, anæsthetisation of, 595
——— kept in manner injurious to health, 554
——— unsound, consumption of, 259
Anthracite coal and smoke abatement, 274
Antiseptic and flushing tank, Austin's, 623
——— experiments in a mortuary vault, 599
Anti-Tobacco Society (French), 572
Antwerp Waterworks Company's Report, 569
Appeal to quarter sessions, 373
Appointments, 41, 95, 146, 233, 285, 332, 377, 424, 471, 524, 572, 618
Arsenic in food, 589
Art and Science, 590
Arterial drainage, 497
——— ——— Mr. Buchan on, 569
Artificial human milk, Mr. Clarke on, 422
——— ——— Voltmer & Co. on, 567
Artisans' and labourers' unsanitary dwellings, 132
——— baths for, 433
——— Dwelling Inquiry Committee (Balham), 423
——— dwellings, abolition of house tax, 423
——— ——— Act in Devonport, 456
——— ——— and building society, 21
——— ——— ——— the Metropolitan Board of Works, 449
——— ——— ——— Labourers' Dwelling Acts, 373
——— ——— in the Marylebone parish, 340
——— ——— Improvement Acts, 615
——— ——— building materials for, 467
——— ——— Company (Dublin), 399
Artisans' dwellings in Petticoat Square 423
——— ——— ——— the City, 384
——— ——— law in respect to, 87
——— ——— ——— law concerning, 337
——— dwellings, model in Glasgow 423
——— homes for, 572
——— railway facilities for, 592
Ashby, Mr. A., on water analysis, 530
——— Dr. H., on notification of infectious disease in Manchester, 386
Ashton & Green's exhibits, 315
Assaulting an Inspector of Nuisances, 578
Assessment Committee, liability of, 373
Association American Public Health, 146
——— ——— Birmingham and Midland Officers of Health, 361
——— ——— Dublin Ladies Sanitary, 133
——— ——— Edinburgh Sanitary Protection, 457
——— ——— Engineers' and Surveyors', 263
——— ——— Manchester and Salford Sanitary, 374, 592
——— ——— Master Plumbers' (Philadelphia), 524
——— ——— Medical Officers of Health (Yorkshire), 130
——— ——— Metropolitan Local Government Officers', 19
——— ——— Metropolitan Public Gardens and Playgrounds, 232, 374, 470, 571, 616
——— ——— Municipal and Sanitary Engineers', 73
——— ——— North British Gas Managers', 73
——— ——— ——— Eastern Sanitary Inspection, 76
——— ——— Western Medical Officers of Health, 263
——— ——— Public Sanitary Inspectors', 77, 147, 257, 269, 362, 407, 601
——— ——— ——— ——— ——— Mr. S. C. Legg on, 40
——— ——— Sanitary Assurance, 507, 570
——— ——— Inspection (Sunderland), 142
——— ——— Scottish Veterinary, 132
——— ——— Social Science, 146
——— ——— Tottenham Sanitary, 65, 551
——— ——— Wolverhampton Sanitary, 457
Aston Manor, Medical Officer's report, 78
——— rural, Medical Officer's report, 134
——— ——— Sanitary Inspector's report, 33
Atkinson, Dr. F. E., on dissemination of disease by milk, 93
——— Dr. F. E., on infant mortality, 381
Atmospheric cowl, the 'Wery,' 277
Audit, law in respect to, 466
Austin Antiseptic Company, 508
Austin's automatic flushing and antiseptic tank, 603
Australian plague, 552
——— slums and their cure, 570
Avenues and boulevards in America, 260
Average value of fuels, 357
Aylesbury rural, Medical Officer's report, 460

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Bacon's, J. L., warm water apparatus, 30
——— (J. L.), system of heating and ventilating, 212, 316, 512
Bacup, Medical Officer's report, 78
Bad meat cases, 466
Bakehouse Act (1883), 450
Bakehouses, duties of Medical Officers in respect to, 526
——— ——— sanitary supervision of, by Dr. Hill (Birmingham), 482
——— ——— suggestions for regulation of, 525
Baker's ventilators, 35
Ballykeel, new water works at, 386
Band in Finsbury Park, 615
Banner's cowls, 421
——— manhole covers, 280
Barking and by-laws as to lodging-houses, 423
Barlow's improvements in trapping sewers, &c., 138
Barnett's (Miss E.) sanitary lectures, 297
Barnsley rural, Medical Officer's report, 78
Barr's compression-cock, 462
Barometric effects from a cup of coffee, 569
Bartlett's weighing machines, 315
Barton's slow combustion stoves, 30
Bate, Dr. G. P., on the calculating slide rule in mensuration and statistics, 582
Bath, Medical Officer's report, 114
—— urban, Sanitary Inspector's report, 31
Baths and bathing, Dr. Willoughby on, 434
——— cheap, in France, 433
——— for artisans, 433
Baxter's stone-breaker, 315
Beccles, Medical Officer's report, 31
Bedding, failure to disinfect, action, 86
Bedford rural, Sanitary Inspector's report, 80
——— urban and rural, Medical Officer's report, 321
Bedridden for nearly half a century, 601
Beer, magnesia in, 124
Bell & Co.'s stained glass windows, 316
Bennor's trap, 84
Berlier's, W. C., urinal and cesspool, 84
Berlin Sanitary Exhibition, 25, 70, 128, 257, 267, 268
Bermondsey, Medical Officer's report, 559
Berwick's water-closets, 602
Bethnal Green, open spaces at, 232
Bevan, Mr. G. P., on Richmond and its water supply, 97
Bicycle on circuit in Australia, 297
Billington's 'Liverpool' spring mattresses, 136
Bilston poor, homes of, 355
Binnie's salt-glazed sewer-pipes, &c., 210
Binz on tea and coffee, *rev.*, 89
Birch-Hirschfeld, Dr., on pneumokoniosis, *rev.*, 90
Birmingham and Midland Association of Medical Officers of Health, 361
——— the Black Country, housing of the poor in, 343, 393, 435, 537, 583
——— bakehouses, sanitary supervision of, 580
——— building materials, exhibition at, 557
——— cattle market for, 355
——— infectious diseases hospital at, 501
——— insanitary condition of dwellings of the poor, 423
——— milk adulteration at, 550
——— milk supply, 450
——— proposed new cattle market for, 355
——— workshops, sanitary condition of, 552
Bischof, Gustav, on copper in food, 363
Bishop Auckland Infectious Diseases Hospital, 569
Black country, common lodging-houses in, 436
Blackman air propeller, 277, 509
Blair's ventilating soil-pipe stench-trap, 209
Blaydon, longevity at, 186
——— sewage scheme, 434
——— scarlet fever at, 329
——— small-pox at, 491
Blood-poisoning from a diseased pig, 550
Blyth, Mr. A. Wynter, on the Artisans' and Labourers' Dwellings Acts, 340
Board Schools, 526
Bodine's sewer-trap, 605
Bolding's closets, baths, &c., 514
Bond's, Dr., liquid cooler, 415
Boracic acid for preserving food, 122
Boulnois's 'Acmé' sewer-pipes, 209
Bournemouth, Sanitary Inspector's report, 80
Bower-Barff Rustless Iron Company, 316, 508
Boyle's flushing apparatus, 604
——— ventilators, 19, 232, 249, 509, 580
Brabazon, Lord, on public washhouses, laundries, and swimming-baths, 432
Bradford, household suffrage and sanitation in, 439
Bradford (Yorkshire), Medical Officer's report, 559
——— Sanitary Inspector's report, 518
Bradford & Co.'s washing and laundry machinery, 29, 86, 218, 514
Brandon and Byshottles, Medical Officer's report, 134
Brawn poisoning at Scarborough, 595
Bread, adulteration of, action, 527
—— alcohol in, 356
Breners' hygienic calorifier, 30
Brentford, drainage of, 375
Brick and tile manufacturers' exhibits at Bristol Exhibition, 313
Bricks and mortar, by Mr. J. Slater, 3
Bride's pipe-joint packing, 276
Bristol Building Materials Exhibition, 313
British Sanitary Company's earth-closets, 208
Brook & Bruce's joinery work, 316
Brown's gas-fittings, 216
Brown & Green's smoke-consuming cottage kitchener, 227
Buchan, Mr. W. P., on arterial drainage, 569
——— on the influence of storms upon water-traps, 49
——— on smoke-test for drains, &c., 612
——— on ventilation, 561
Buchan's exhibits at Glasgow Exhibition, 205
Building in New York, 259
——— laws, Herbert Spencer on, 65
——— leases, 561
——— line, law in respect to, 88
——— materials, Mr. J. Slater, B.A., on (*continued*):—II. Bricks and mortar, 3; III. Building stones, 102; IV. Roof coverings, 441
Building Materials Exhibition at Bristol, 313
——— for artisans' dwellings, 457
——— inferior quality of, 65
——— regulations in Paris, 399
——— societies and artisans' dwellings, 21
——— stones, by Mr. J. Slater, B.A., 100
——— Trades Exhibition at Agricultural Hall, 410, 507
Builth rural, Medical Officer's report, 321
Bukarest, annual report of Board of Health of, *rev.*, 141
Bullar, Miss, on open street doors, and the supervision of tenement houses, 55; discussion on, 57
Burdett, Mr. H., on the dwellings of the middle classes, 168; discussion on, 198
Burial grounds, disused, 429, 470
Burnham and its water supply, 431
Butter, American, 449
Butter and milk adulteration, action, 464
——— American, 553
Bury, disposal of sewage at, 264; hospitals and baths at, 264; public park for, 571; Sanitary Inspector's Report of, 33, 518; waterworks of, 264
Butcher shops and slaughter-houses, 308
Byles, Mr. W. P., on household suffrage and sanitation in Bradford, 439

Calcutta, infectious diseases at, 498
——— Medical Officer's report, 559
Calverley urban, Medical Officer's report, 411
Calvert's carbolic acid, 226
Camberwell, public mortuary at, 297
Camborne, housing of the poor at, 571
Cambridge examinations on state medicine, 304
——— sanitary science examinations, 233
Cameron, Dr. C. A., homes of the poor in Dublin, 295
Canal Boats Act Amendment Bill, 429
Candy & Co.'s bricks and ornaments, 314, 510
Can Parliament break faith? *rev.*, 564
Carcasses, disposal of, 332
Carlton urban, Medical Officer's report, 32
Carmarthen urban, Medical Officer's report, 78
'Carmichael' closets, 205
Carnarvonshire, Medical Officer's report, 461
Carpet-beating a nuisance, 606
Carrick's exhibits at Glasgow, 217
Carron's exhibits at Glasgow, 217
Cashmore & Co.'s cut and stained glass, 316
Cassal, Mr. C. E., and Dr. Whitelegge on examination of water for sanitary purposes, 427, 479
Cassel's sewer gastrap, 82
Cast-iron for housedrains, by Mr. W. D. Scott-Moncrieff, C.E., 1
——— water-traps, cleaning of, 67
Cattle market for Birmingham, 355
Caution as to disconnecting chambers, 249
Cedar felt, patent, 610
Ceilings, low, in small houses, 174
Census Report, General, 357
Cesspools, classes of, 247
——— disconnection of, 234
——— in old houses, 247
——— law as to, 247
——— objection to, 247, 332
——— overflow of, 247
——— ventilation of, 247
Chadburn & Son's mechanical engine and steering telegraphs, 29
Chailey rural, Medical Officer's report, 411
Chambers, Mr. G. F., Hints on Sanitary Law, *rev.*, 565
Chapman's lead trap and cesspool, 82
Chatwood's safes and locks, 29
Cheap sanitary literature, 329
Cheatens' filter, 29
Cheltenham, Medical Officer's report, 322
Chemical composition of fish, 122
Chemistry and sanitation, 312
Chepstow rural, Sanitary Inspector's report, 325
Chester-le-Street, overcrowding at, 615
——— rural (Harrington division), Medical Officer's report, 322
Chicago and smoke prevention, 489
——— canned beef, 309
Children, isolation of, in hospitals, 498
——— physical condition of, and present educational system, 527
Chimney and ventilating cowl, Leslie's, 610
——— cowls and ventilators, Davis, Jones, & Girdwood's patent, 274
China, cremation in, 616
Chipping Sodbury rural, Sanitary Inspector's report, 325
Cholera and Worcestershire sauce, 163
——— Asiatic, discussion on, 130
——— epidemics, by Dr. Christie, 193
——— Hospitals for the Metropolis, 120
——— ——— (Ireland) Act, 118
——— in Europe, probable invasion of, 47
——— precautions against, 120
——— ——— ——— by the Tyne Port Sanitary authority, 143
Chorlton & Dugdale's 'Excelsior' mattress, 219
Christie, Dr., on cholera epidemics, 193
Chubb's safes and locks, 29
Cigarette, 'The Strawfena,' 228
Cirencester rural and urban, Sanitary Inspector's report, 325
Cisterns, waste-preventing, Cross's, 368
City Commissioners of Sewers and cremation, 617
Civil Engineers, Institute of, 41, 617
Clark, Bunnett, & Co.'s Exhibits, 29, 316
Clarke, Mr. D., on Artificial Human Milk, 470
——— Mr. T. Chatfeild on Improved Labourers' and Artisans' Dwellings, 539
Clarke's plumber's trap, 462
Claydon, Mr. C. S., on ingenious malpractices, 613
Claye's exhibits at Glasgow, 210
Cleansing of cast-iron water-pipes, 67
Cleator Moor, Medical Officer's Report, 411
Clerkenwell, insanitary condition of dwellings, 423
Clerks of guardians, appointments of, *see* Appointments
Cliff's exhibits at Glasgow, 210
Closets, Bolding's, 514
——— Dale's 'European,' 512
——— Keith's automatic, 213
——— Moule's earth, 516
——— Pearson's 'Twin,' 507
Coal-tar soap, 226
Colchester new water tower and tank for, 183
Coles, Mr. W. R. E., on smoke abatement, 181; discussion, 201
Collins, Mr. J., on the utilisation of town refuse, 189
Collins & Pike's sewer inlet, 275
Common lodging-houses in the Black Country, 436
Commons, 373
——— breach of by-laws, 466
Comparative value of milk, 258
Compensation for disturbance, 120, 592
——— ——— to ejected tenants, 357
Competitions, 41, 94, 145, 232, 284, 377, 424, 470, 572, 617
Compressed air power, 611
Compression cock, Barr's patent, 462
Compton, Lord W., on the London poor, 469

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Compton, Lord W., on the position and duties of ground landlords in London, 490
Compulsory removal to hospital, 96, 146
—— suspension of business, compensation for, 592
Condensed milk, action, 607
—— —— Company of Ireland, 221
Conferences, 95, 617
Congresses, 145, 232, 330, 617
Constantine's 'Treasure' Range, 576
Consumption of unsound animals, 259
Contagious Diseases Animals Act, 124
Contract, law of, 87, 88
Convalescent aid, organisation of, 610
Cooper's (H. W.), exhibits at Glasgow, 220
—— (J.) ventilating pipe and cowl, 37
—— (W.) overflow valve, 37
Copenhagen, International Medical Congress at, 232
Copper and lead in food, 260
—— in food, M. Gustav Bischof on, 353
—— Mr. Kingzett on, 305
—— in jam, 597
—— poisoning. Mr. Fosbroke on, 484
Copyholds and leaseholds, 495
Corfield, Professor, on sanitary arrangements of houses, 7
—— —— on compulsory notification of infectious diseases, 76
Cork Improved Dwellings Company, 469
Cornwall, salaries in, 19
Corrections, 46, 284, 329, 425
Cost of milk adulteration, 591
Costless ventilation, Mr. P. Hinckes Bird on, 569, 613
Costs, law of, 87
Cottage kitchener, smokeless, 227
Coventry, new park at, 232
—— Sanitary Inspector's report, 80
—— urban, Medical Officer's report, 322
Cowl, new patent, 274
—— testing, Mr. J. C. Ellison on, 421
Cowls, Banner's, 421
Cows on footpaths, law in respect to, 46
Cox's grate attachment, 326
—— save-all cooking stoves, 558
Craig's exhibits at Glasgow, 209
—— sewer or stench trap, 83
Cremation and earth burial, 354
—— anecdote, 617
—— at Gotha, 572
—— in China, 616
—— in Mexico, 374
—— New England Society, 571
—— notes, 571, 616
—— of the remains of Dr. Gross, 617
—— Sir Henry Thompson on, *rev.*, 609
—— Society of England, 455
—— —— New Orleans, 616
—— —— York, 616
—— the law with respect to, 455
Crematorium at Ilford, proposed, 617
—— Roman, 617
Croydon rural, sanitary authority, 423
Cross's waste-preventing cisterns, 308
'Crown' patent closet, 335
Cultivation of mushrooms, 238
Cup of coffee as a barometer, 569

Dairies and milkshops, inspection of, 483
—— supervision of, 24
Dairy Company, a new, 567
Dale's 'European' valve closet, 512
Dampness in houses, 489
Dangers arising from upsetting cheap lamps, 313, 367
Davis, Jones, & Girdwood's cowls and ventilators, 274
Day nurseries in Glasgow, 351
Dead prisoners, 125
Deards' warming apparatus, 368
Death-rate, excessive, of Newcastle, 95, 142, 231, 245, 310, 390
—— high at Rawmarsh, 65
—— of Haltwhistle rural, 613
—— Hexham, 283, 613
Defective drainage and Scotch law, 465
Defects (common) in the sanitary arrangements of houses, by Prof. Corfield, 7
Dejem's (Nijmegen) open fireplaces, 30
Demerara, refuse removal in, 66
Denman, Mr. Justice, on the dwellings of the poor, &c., 437
Dennis's arrangement for securing door-knobs, 595
Dental appliances at Berlin Exhibition, 130
Deodoriser, Nicholl's patent, 36
Deodorising and disinfecting apparatus, Wood's patent, 237
Desiccation in France, by Dr. Lagneau, 171
Deposits of dust, &c., in excavations, 554
Derby, Sanitary Inspector's report, 518
Detecting trichinæ in meat, 499
Deutsches Wochenblatt für Gesundheitspflege, &c., Von Dr. P. Börner, *rev.*, 372
Devoll's flushing syphon, 603
Devonport artisans' dwellings, 436
Dick's exhibits at Glasgow Exhibition, 218
Diespeker's mosaic flooring, 510
Dilapidated houses, 304
Dilatory Local Board, 463
Diminution of disease by compulsory notification, 307
Disabilities of nuisance inspectors and their remedy, 176
—— —— —— —— discussion on, 195
Disconnection of cesspools from house-drains, 234
—— —— drains, 248
—— —— house-drains from sewers, 108
Disease and sewer gas, 498
—— an unemployed factor in the prevention of, by Mr. P. Q. Karkeek, 482
—— diminution of, by compulsory notification, 307
—— infectious, and house-letting, 593
—— —— furnished houses, 606
—— precautions against 183
—— prevention, Dr. C. Fox on, *rev.*, 610
—— —— —— of, 193
Diseased meat cases, 143
—— —— poisoning by, 124, 356
—— —— prosecution, 87
—— —— question, discussion on, 132
Diseases, compulsory notification of, by Professor Corfield, 76
—— infectious, at Calcutta, 498
—— —— compulsory removal, 426
—— —— hospital at Birmingham, 501
—— —— —— —— Bishop Auckland, 569
—— —— —— —— Newcastle, 232, 542
—— —— —— hospitals, 620
—— —— —— in Manchester, provisional order, 386
—— —— —— notification of, 60, 357
—— —— —— —— —— by Mr. G. H. Percival, 394
—— —— —— —— in Ireland, 409
—— Prevention (Metropolitan) Act, 116
Disinfectant, a new, 569
Disinfectants, 225
Disinfecting and drying walls, 259
Disinfecting rags, Illingworth's patent, 519
Disinfection by heat, Dr. Adams on, 202
—— —— steam, 84
—— —— neglect of, 86
—— —— of public conveyances, 46
Disposal of carcases, 332, 378
—— —— house refuse, by J. P. Spencer, 252
—— —— refuse in Nottingham, 364
—— —— sewage at Bury, 264
Disqualification of members of local boards, 22
Dissemination of disease by milk, 93
Disused burial-grounds, 429
—— churchyards as recreation grounds, 94
Dobbs, Mr., victory of, 66
Domestic antiseptics, 281
—— fire-escape, Nobes' patent, 278
—— refuse and night soil removal and disposal, 190
Dorking sewerage works, 375
Doulton & Co.'s exhibits at Sanitary Institute Exhibition, 205
Dover, Medical Officer's report, 32
—— opening of new park at, 94
Drainage, arterial, 497
—— bad and good, illustrated, 110
—— —— a remarkable case, by Mr. W. D Scott Moncrieff, 485
—— case, 465
—— defective, and Scotch law, 465
—— defects, 67
—— in houses, faults in, 106, 247, 349
—— law of the metropolis, 107
—— of houses, law as to, 106
—— —— new houses in urban districts, 107
—— —— undrained houses, 106
—— rate, law of, 373
Drain and other pipes, testing of, by Mr. James Stewart, 184
—— —— —— discussion on ditto, 197
—— air and typhoid fever, 22
—— pipe joints, Edwards & Williams' patent, 519
—— pipes, 526
Drain pipes, Noot's patent, 137
—— ventilation, 600
Drains, disconnection of, 248
—— cast iron for, by Mr. W. D. Scott Moncrieff, C.E., 1
—— nuisance from, 107
Draughts, apparatus for facilitating, 369
Drinks at the Berlin Sanitary Exhibition, 130
Drummond & Lindsay's patent glazing, 221
515
Drunkenness among pigs, 489
Drying walls and disinfecting, 259
Dublin Artisans' Dwellings Company, 469
—— —— —— —— —— and their tenants, 399
—— Ladies Sanitary Association, 133
—— the homes of the poor in, by Dr. Cameron, 295
Du Bois' plumbers' trap, 604
Dudfield, Dr. T. O., on Metropolitan Sanitary Administration, 235
Dudley Guardians and a weekly fish-dinner, 351
Duff, Mr. H., on legal obligations in respect to dwellings of the poor, *rev.*, 608
Dumbarton, public park for, 423
Dunckley, Mr. H., thirty years of household suffrage in Manchester in relation to its sanitation, 345
Dunfermline, baths for, 523
Dursley rural, Sanitary Inspector's report, 325
Dust bins, 96, 144
Duties and liabilities of landlords, 119
Dwelling-houses Inspection Bill, 502, 553
Dwellings for the poor in the city, 423
—— —— —— —— of Southwark, 523
—— —— working men at Mulhausen, 309
—— improved, for labourers and artisans, Mr. T. Chatfeild Clarke, 539
—— in crowded districts, 448
—— labourers, in Liverpool, 437
—— of the London poor, 376
—— —— middle classes, Mr. H. C. Burdett on, 198; discussion, 198
—— —— poor, essays on, 424
—— —— —— improvements of, 397
—— —— —— in large towns, by Mr. E. Hoole, 473
—— —— —— —— Mansion House Committee, 399, 454; report, 506

Earth-burial *v.* cremation, 354
—— closets, British Sanitary Company's patent, 208
—— —— Heap's, 208
—— —— Moule's, 516
Eassie, Mr. W., C.E., on the relations between geology and sanitation, 51
East Barnet Valley urban, Sanitary Inspector's report, 325
—— Dereham, Medical Officer's report, 421
—— —— rural, Sanitary Inspector's report, 325
Eckler and Angerstein on gymnastics, *rev.*, 90
Economics of sanitation, 258
Edinburgh, notification of infectious disease at, 357
—— Sanitary Protection Association, 409
Edinger's apparatus for washing urinals, &c., 82
Education, 152
—— Act, health effects of, and sanitation of watering-places, 613
—— and competition, 268
—— conference, 617
Edwards & Stavoren's traps, 82
Egremont Local Board and clerk's salary, 19
Eiderdown ventilating quilts, 417
Electric lighting, 410
—— light in theatres, 125
Electrical appliances at the Berlin Exhibition, 129
Electro-glacial applicator, 86
Elgin's and Gilchrist's wood covering, 219
Elliott, Mr. J. M., on proposed extension of powers of the local sanitary authorities, 60
Ellison, Mr. J. E. M., on cowl testing, 421
Ellison's ventilators, 214, 304
Elwick Park, extension of, 616
Emanuel's water-closet, 603
Emptage, Mr. D., on water-closets in general use, 187; discussion, 197
Emptage's new pattern lead-trap, 210
Enfranchisement of copyholds and leaseholds, 495
Engineers and Surveyors' Association, 263
—— Municipal and Sanitary Association, 73
English urban mortality in 1883, 352
Ennerdale Railway Bill, 615
Epidemic and other Diseases' Prevention Act, 118

Digitized by Google

Epping rural, Medical Officer's report, 559
Etiology of enteric fever, 121
Eulenberg's 'Handbuch des Offentlichen Gesundheitswesens,' vol. ii., *rev.*, 88
European capitals, recent mortality in, 21
Evans' patent spigot, 604
Evans & Lewes's signal and life-throwing guns, 29
Everyday sanitary doings, 312
Evesham, waterworks for, 396
Examination of Inspectors of Nuisances and Local Surveyors, *examination papers*, 620
——— water for sanitary purposes, by Mr. C. E. Cassal and Dr. Whitelegge, 427, 479
Excessive death-rate of Newcastle, 425
Excreta disposal, cost of, 265
Exhibition at Amsterdam, 27; list of awards, 269
——— Building Trades,' Agricultural Hall, 410, 507
——— ——— Birmingham, 557
——— ——— Bristol, 313
——— Fisheries, International awards, 284
——— Gas, at Middleburgh (Netherlands), 329
——— Health, International, 318–20, 331, 362–4, 367, 388, 401, 406, 407, 455, 456, 470, 505, 506, 523, 572, 617
——— National Health Society's awards, 30
——— Sanitary, at Berlin, 25, 70, 128, 257
——— ——— and Medical, at Nice, 41
——— Sanitary Institute, at Glasgow, 204, 572

Factories and Workshops Amendment Act, 127, 426
Fæcal matters, apparatus for treatment of, 274
Fairbairn's exhibits at Glasgow Exhibition, 205
Farthing's W.C. shut off, 83
Fat melting, nuisance from, 148
Faults of drainage in houses, 106
Featherstone, Medical Officer's report, 560
Fever, enteric, etiology of, 121
——— typhoid and drain air, 22
——— ——— Dr. J. F. Sutherland on, and discussion, 194
——— ——— in Kentish Town, 144
Fevers and other diseases, how to avoid, *rev.*, 610
Filters, silicated carbon, 370
Filtre, rapide, Maignen's, 512
Fire escape, Nobes' patent, 278
——— precaution against, at public institutions, 313
First Swiss Alpine Milk Company, 127
Fish, chemical composition of, 122
——— dinner for workhouse inmates, 351
——— dinners, 125
——— frying, 549
Fitzgerald, Mr. J. Vesey, on labourers' dwellings in towns, 240; on water rates, 430
Flesh and milk of tuberculous animals, 551
Floor-traps, 110
Flour, coarse and fine, merits of, 201
Flush cisterns, Wright's, 36
Food, a new, 186
——— copper and lead in, 260
——— preservation of, by boracic acid, 122
——— unwholesome, actions, 88, 608
——— warmer and night-light, 467
Foot (the) and its covering, 151
Foreign criticism, 546
Forwood, Mr. J. A. B., on the dwellings of the industrial classes in Liverpool, 287
Fosbroke, Mr. J. H., on copper-poisoning, 484
Fox, Dr. C., on disease prevention, *rev.*, 610
France, depopulation in, 171
——— population of, 392
Frankfort-on-the-Main, sewerage of, Dr. Willoughby on, 251
——— ——— ——— Mr. J. Gordon, M. Inst. C. E., on, 328
French vital statistics, 356
Fresh air for ailing London children, 571
——— element, a, 357
——— fields and pastures new, 93
Frome rural, Medical Officer's report, 134
Frying fish a nuisance, action, 372
Fuels, average value of, 357
Furnished rooms in Paris, inspection of, 429

Gairdner, Professor, on the prevention of disease, 193
Galloway's (Manchester) exhibits at the Amsterdam Exhibition, 29
Gardiner & Son's (Bristol) hardware goods, 315
Gardner's exhibits at Glasgow Exhibition, 219
Gas appliances at the Bristol Exhibition, 318
——— as an illuminant, 123
——— cooking stoves, 514
——— Heating and Lighting Company's exhibits, 513
——— pipes, testing of, 487
Gateshead building at, 65
——— Corporation of, 142
——— house-to-house visitation at, 329
——— isolation hospital for, 449
——— Medical Officer's report, 322
——— small-pox at, 65, 142
——— white lead poisoning at, 65
Gentle hint, a, 388
Geology and sanitation, relations between, 51
Georgetown Medical Officer's report, 560
German pork and trichinosis, 548
——— stoves *v.* English fireplaces, 328
Gibb's heating apparatus, 388
Gilbert's water-closets, 207, 602
Giles & Co.'s gas arparatus, 313
——— Mr. B., the decease of, 570
Glacialine, 291
Gladstone, Miss I. M., on London burial grounds, 575
Glanford Brigg Guardians and Rural Sanitary Authority, 39
Glasgow day nurseries, 351
——— Congress of Sanitary Institute at, 145
——— Exhibition of Sanitary Institute at, 204
——— notes on house sanitation in and around, 178
——— sanitary condition of, 195
——— ——— Protection Association, 457
——— the rehousing of outcasts, 294
Glass bowls for water-closets, Hatch's patent, 463
Glazing, Deards' patent, 516
——— Drummond & Lindsay's patent, 515
Gloucester rural, Sanitary Inspector's report, 225
Gloucestershire combined district, 322
Good in everything, 596
Goode's patent water-waste preventer, 210
Gordon, Mr. J., on the sewerage of Frankfort, 328
Govan, Sanitary Inspector's report, 518
Grand Junction Water Company, memorandum on, *rev.*, 565
Grate, Jaffrey's patent, 468, 511
——— Princess Louise Coil, 516
——— 'The Nautilus,' 522
——— Thompson's smoke-consuming, 468, 611
Green's (Manchester) exhibits at the Amsterdam Exhibition, 29
——— sewage trap or gulley, 138
Grocers' Company Research Scholarship, 617
Groom's domestic exhibits, 280, 512
Ground landlords in London, position and duties of, by Lord Wm. Compton, 490
Guildford rural, Medical Officer's Report, 560
Gymnastics and the London School Board, 483
——— Eckler & Angerstein on, *rev.*, 90

Habits of the landlord, 365
Habitual drunkards, legislation for, 305
Haigh's flushing apparatus, 414
Halifax urban, Medical Officer's Report, 134
——— ——— Sanitary Inspector's Report, 80
Hall's porcelain baths, 210
——— stained glass and paint, 314
Hammond's patent for facilitating draughts, 369
Handsworth, Medical Officer's Report, 79
——— urban, Sanitary Inspector's Report, 32
Hanley, Medical Officer's Report, 560
Harborne urban, Sanitary Inspector's Report, 81
Harcourt, Thompson, & Co.'s system of ventilation, 312
Hardy plants, prize for, 471
Harriman & Co.'s exhibits at the Amsterdam Exhibition, 29
Harrington's improvements in ventilating sewers, 230
Harrison, Mr. J. T., on Artisans' and Labourers' Dwellings Improvement Act, 615
Harrison's exhibits at Glasgow Exhibition, 210
Hart, Mr. Ernest, on smoke abatement, 271
Hartismere rural, Medical Officer's Report, 461
Hastings, Medical Officer's Report, 134
——— Sanitary Inspector's Report, 32
Hatch's glass bowls for water-closets, 463
Hawes' sediment trap, 36
Hayward & Eckstein's exhibits, 512
Hayward Tyler & Co.'s exhibits, 590
Health, Professor Humphrey, M.D., on, 149
——— Exhibition, International, 318–20, 331, 362–4, 367, 406, 455, 470, 505, 523, 570, 617
——— lectures for ladies at Newcastle, 310
——— legislation in Michigan, 22
——— of Ireland, 133, 366, 600
——— officer, duties of, 61
——— resorts, summer, 500
Heap's earth-closets, 208
Heating of our houses, 402
Hebburn, Medical Officer's report, 461
——— Sanitary Inspector's report, 81
Helliwell's apparatus for water-closets, 602
Helmsley rural, Medical Officer's report, 461
Hemel Hempstead rural, Sanitary Inspector's report, 326
Hendon, drainage works at, 598
——— rural, Sanitary Inspector's report, 326
Hereford urban, Sanitary Inspector's report, 34
Heron's gas-burners, &c., 317
Hexham, death-rate at, 283, 613
——— rural, Medical Officer's report, 561
Heyden's exhibits at Amsterdam Exhibition, 29
High buildings in Chicago, 558
Highway Act, proceedings under, 466
——— board, powers of, 465
——— stopping up of, 466
Highways, law of, 88, 373
Hill, Dr. A. (Birmingham), on the sanitary supervision of bakehouses, 580
Hill & Hay's 'Excelsior' syphon ventilator, 216
Hinckes-Bird, Mr., on costless ventilation, 560
Hints as to what to do in the presence of cholera, 111
——— how to avoid fever and other diseases, *rev.*, 610
——— on sanitary law, by Mr. G. F. Chambers *rev.*, 565
——— practical, on ventilation, 487
——— to house-hunters and householders, by Mr. Ernest Turner, *rev.*, 609
——— Sanitary Inspectors (continued):—Nuisance repression, 12; faults of drainage in houses, 106, 247, 349, 389, 486
Hodkinson & Clarke's exhibits, 316, 513
Hogg, Mr. W. D., *La Médicine Publique en Angleterre*, *rev.*, 139
Holiday colonies of sick children at Frankfort, report of the association for promoting, *rev.*, 609
Holme Valley, Medical Officer's report, 323
Holsworthy rural, Medical Officer's report, 32
Homes for artisans, 570
——— of the Bilston poor, 355
——— Southwark poor, 408, 427, 523
Honeyman, Mr. J., on the advantage of low ceilings in small houses, 174
Hoole, Mr. E., on the dwellings of the poor in large towns, 473
Hopewell & Co.'s fire and bearing bars, 29
Hops and hop-pickers, Rev. J. Y. Stratton on, *rev.*, 466
Horse-flesh, diseased, and sausages, 183
——— ——— sale of, as beef, 24
Horsemonger Lane Gaol, site as a recreation-ground, 374, 571
Hospital committee action, 466
——— compulsory removal to, 94, 146
Hospitals and baths at Bury, 264
——— for infectious diseases, 620; at Birmingham, 501
——— for isolation, 358, 449
House construction, some sanitary aspects of, 164
——— drains, 486; disconnection of, 108; testing of, 486
——— drainage at Lambeth, 124
——— letting and infectious disease, 593
——— refuse, disposal of, 252
——— sanitation, 312
——— ——— in and around Glasgow, 178
Houses, dampness in, 489
——— heating of our, 402
Housing of the poor, 373, 422, 469, 498, 523, 570, 615
——— ——— in Birmingham and the Black Country, 343, 393, 435, 537, 583

Digitized by Google

Housing of the poor in Camborne, 571 : in Paris, 346 : in Stonehouse, 304
——— Royal Commission on, 399, 571
Hove, Medical Officer's report, 79
——— Sanitary Inspector's report, 34
Howard (the) medal, 232
How to live rent free, 356
How to proceed with unhealthy dwellings, 372
Howie's exhibits at Glasgow Exhibition, 209
Hubert, Mr., on trap ventilation and syphonage, 375
Huddersfield, Medical Officer's report, 561
——— new park at, 283
Hull and the dwellings of the poor, 423
—— small-pox spread through school congregation at, 593
Human milk, artificial, 420
Humphry, Prof. G.M., M.D., on health : a State sanitary department : naval and military sanitation : the treatment of infants : the foot and its covering : education : ventilation : general sanitation, 149
Hunter's ventilator exhausters, 369
Hydes & Wingfull's tortoise stoves (Portway's patent), 218
Hygiene and animal physiology, classes in Liverpool, 233
——— class for the study of, 233
——— in schools, 255
——— of schools in America, 104
——— work on, 148
Hygienic instruction in American colleges, 426
——— sewer furnace, 417
——— sweets, 522
——— value of mirth, 23
——— waterproofing, 67
Hygienische Tagesfragen, II. Die Kanalgase, by Dr. F. Renk, *rev.*, 91

Illingworth's apparatus for disinfecting rags, 519
Il propugnatore della Salute, *rev.*, 282
Improvement of the dwellings of the poor, 397
Impure ice, sale prohibited in Connecticut, 580
Imray's water-closets, 137
Indestructible Paint Company, 513
Industrial city an, 257
——— Dwellings Company, 95, 469
Inebriates, chronic, State control for, 452
Infant mortality at Newcastle, 142
——— ——— Mr. F. E. Atkinson on, 381
Infants' lives, insurance of, 66, 357
——— treatment of, 151
Infected persons, removal of, to hospital, 61
——— rags and small-pox, 550
Infectious hospitals, 620
Influence of storms upon water-traps, 40, 94
Influenza epidemic, 62
Ingenious malpractices, Mr. C. E. Claydon on, 613
Inhabited house duty, 434
Inlets 484
Insanitary dwellings in Whitechapel, 243
——— houses, 607
——— housing of the poor, 379
Inspectors of Nuisances, appointment of (*see* Appointments)
——— ——— disabilities of, and their remedy, 176
Insurance of infants' lives, 66, 357
Institute, Sanitary, 75, 95, 145, 330, 617, 620
Institution of Civil Engineers, 41, 617
——— Smoke Abatement, 174
Interest of justices, 83
Inverness new drainage scheme, 375
Ipswich, Medical Officer's report, 561
Ireland, health of, 133, 366, 600
——— notification of infectious diseases in, 409
Irish Labourers' Act, 470
Irwin's ventilator and chimney-cap, 37
Islington, Medical Officer's report, 561
——— recreation ground for, 329
Isolation hospitals, 348, 449
——— of children in hospitals, 498

[illegible]'s woollen clothing, 417
[illegible]'s patent grate, 468, 511
[illegible], copper in, 597
[illegible], sanitary progress in, 591
[illegible] Health Society, 356

Jarrow, Sanitary Inspector's report, 515
Jennings's sanitary engineering goods, 315
Jeyes' perfect purifier, &c., 226
Joint-wiper, Reach's patent, 38

Kaio Kapnos grate, 316
Karkeek, Mr. P. Q., an unemployed factor in the prevention of disease, 482
——— ——— on the housing of the poor, 614
Keeping cattle in slaughter-houses, 146
Keighley urban, Medical Officer's report, 323
——— ——— Sanitary Inspector's report, 326
Keith's automatic closet, 213
Kenilworth, Sanitary Inspector's report, 81
Kentish Town, typhoid fever in, 145
Kettering, Medical Officer's report, 135
King's (Bristol) electrical apparatus, 315
King's Norton rural, Medical Officer's report, 461
——— ——— ——— Sanitary Inspector's report, 519
King's principles of health, *rev.*, 281
Kingzett, Mr. C. T., on copper in food, 304
——— ——— on the sanitary use of perfumes, 493
Kirkwood's bath, 221
Kitchen ranges at Bristol Exhibition, 318
Kite's exhibits, 215, 508
Kyrle Society, 40, 94, 523

Labourers and artisans, improved dwellings for, Mr. T. Chatfeild Clarke on, 539
——— dwellings in Liverpool, 437
——— ——— in town, Mr. J. Vesey Fitzgerald on, 240
——— (Ireland) Act, 118
Lamb, Mr. J. B., on ventilation, 422
Lamb's 'Triumph' ventilator, 215, 509
Lambeth, house drainage at, 124
Lamp extinguishers, self-acting, 416
Lamps, cheap, dangers of, 313, 366, 410
'Lancashire' open fire-grate, 228
Lancaster, dwellings of the industrial classes in, Mr. A. B. Forwood on, 287
——— urban and rural, Medical Officer's report, 561
Landlord and tenant, action, 87
Landlords, duties and liabilities of, 119
——— the habits of, 365
Laundry appliances, Bradford's, 514
Lavatories and baths, Lawson's improvements in, 370
——— &c., disconnection of, 351
Law relating to the borrowing of money by local authorities, *rev.*, 38
——— municipal corporations, *rev.*, 372
Law reports :—
A dilatory local board, 463
Bird *v.* Lord Greville, infectious disease and furnished houses, 606
Condensed milk, prosecution, 607
Disinfection, neglect of, 86
Frying fish a nuisance, 372
How to proceed with unhealthy dwellings, 372
Insanitary houses, 607
Liability of local authorities, 372
Lusher *v.* Gibbs, carpet-beating a nuisance, 606
Nuisance, neglect to obey magistrate's order, 87
Smoke abatement, 86
Supplying adulterated milk to workhouse, 607
Taking the cream off, 283.
The Lea Conservancy Board *v.* the Mayor of Hertford and others, 605
Unwholesome food, 608
Water companies' charges, 373
Laws concerning artisans' dwellings, 337
Lawton's sanitary closet receptacles, 369
Lead poisoning, 434
—— trap or cesspool, Chapman's patent, 82
Leader, Mr. J. D., on forty years of household suffrage in Sheffield in reference to its sanitation, 395
Leakage in pipes, Taylor's patent for, 413
Leask's water-closet apparatus, 274
Ledbury rural, Sanitary Inspector's report, 34
Leeds, improved workmen's dwellings in, 469
Leek, Sanitary Inspector's report, 81
Legal : diseased meat, 39 ; justices, 88 ; water companies charges, 570 : water supply, 524
Legal cases, brief notes of :
——— accident to sewer, 87
——— adulteration of food, 373
——— appeal to quarter sessions, *ib.*
——— artisans' dwellings, 87
——— audit, 466
——— building line, 88
——— commons, 373, 466
——— contract, 87, 88
——— costs, 87
——— diseased meat, 87
——— drainage rate, 373
——— highway, 88, 371, 466
——— hospital committee, 466
——— interest of justices, 88
——— landlord and tenant, 87
——— legal proceedings (justices), 88
——— liability for accidents, 87
——— of assessment committee, 373
——— Local Government Board, 87, 88
——— market, 87
——— rating, 465
——— nuisance, 88
——— obstruction of street, 373
——— parochial election, 87
——— paving expenses, 87
——— pollution of stream, 373
——— powers of highway board, 466
——— rate, *ib.*
——— rating of railway, 373
——— ——— unlet land, 466
——— rates, 87
——— scavenging, 466
——— sewers, *ib.*
——— stopping up of highway, *ib.*
——— street, 88
——— street-paving, 373
——— unwholesome food, 88
——— urinal, 87
——— water powers, 87
——— obligations in respect to dwellings of the poor, *rev.*, 608
Legg, Mr. S. C., on the association of public sanitary inspectors, 40
Legislation for habitual drunkards, 305
——— on health in Michigan, 22
Leicester, Medical Officer's Report, 323
Lemle's rain-water cut-off, 82
Leoni's gas fires, 327
Leslie's chimney and ventilating cowl, 610
Liability of assessment committee, 373
Liddle, Dr., a well-marked tribute to, 357
Life-saving appliances, 128
Lifts, accidents from, 367
Lights to basements, 517
Limehouse, Medical Officer's report, 562
Liverpool Engineering Society, 506
——— labourers' dwellings in, 437
——— new water scheme, 143, 283
——— science and art classes, 233
——— the dwellings of the industrial classes in, Mr. A. B. Forwood on, 287
——— typhus fever in, 23
'Liverpool' (the) spring mattresses, 136
Liversedge, Medical Officer's report, 562
Local boards, disqualification of members of, 22
——— ——— &c., list of new members of, 42-45
——— Government, Mr. Chalmers on, *rev.*, 371
——— ——— ——— Board, 594
——— ——— ——— ——— Medical Department, 23
——— ——— ——— ——— Report of Medical Officer of Health, 586
——— intelligence as to Health Officers, 147, 234, 286, 331, 378, 425, 472, 523, 574, 619
——— loans of England and Wales, *rev.*, 38
——— surveyors, &c., examination of, 284
Lock-faucet, Sargent's patent, 463
Lodging-house, dirty condition of, prosecution, 410
——— houses, common, inspection of, 301
——— ——— for the poor as an investment, 296
——— ——— in Paris, sanitary regulations for, 422
Lodgings, houses let in, regulations for, 494
London burial-grounds, Miss I. M. Gladstone on, 575
——— dwellings, Prof. Roger Smith on, and discussion, 195
——— Government Bill, 548
——— Medical Record, Holiday Number, *rev.*, 91
——— South, storm overflow sewer for, 614
——— water question, 309

Digitized by Google

London water supply, 143
——— ——— ——— report on, *rev.*, 564
Longevity at Blaydon, 186
Louisiana State, report of the Board of Health, *rev.*, 140
Low ceilings in small houses, 174
Low's air injector and downcast ventilator, 369
Lower Thames Valley drainage, 283, 365
Luton urban, Sanitary Inspector's report, 34
Lyon's disinfecting apparatus, 84
Lytham, Medical Officer's report, 562
——— Sanitary Inspector's report, 81

MacCallam, Mr. H., on the distribution of the poor in London, *rev.*, 407
Madras, small-pox in, 524
Magistrate's order, disobeying of, 87
Magnesia in beer, 124
Maignen's filtre rapide, 220, 512
Maldon rural sanitary authority, 143
Malvern Hills, 492
Manchester and Salford Sanitary Association, 592
——— Coffee Tavern Company, 437
——— corporation and domestic water-rate, 447
——— fifty years of household suffrage at, in relation to its sanitation, 345
——— notification of infectious diseases in, 386
Mandamus to compel works of sewerage, 574
Mangotsfield Pennant Stone Company, 503
Manock's stench traps, 520
Manor of Aston urban, Sanitary Inspector's report, 34
Mansion House Council on the dwellings of the poor, 399, 454; report, 506
Market Harborough drainage, 143
——— lands, law in respect to, 87
——— rating, 466
Martyrs to cleanliness, 543
Massacre of the innocents, 588
Masters, Mr. H., on the influence of storms upon water-traps, 94
——— tinned food, 376
——— trap ventilation and syphonage, 375
May, Mr. E. S., on the tenure of office of Sanitary Inspectors, 298
Mayor's non-absorbent roofing-tiles, 566
McCallum's tip-tank cistern, 207
McGuire's water-closet valve, 276
McHaffie's exhibits at Glasgow Exhibition, 215
McKee's flushing apparatus, 210
McMullin's electro-glacial applicator, 86
Meat, bad, prosecution, 465
——— detecting trichinæ in, 499
——— diseased, poisoning by, 124
——— preservation of, 517
——— trichinous, prohibition of, 398
Mechan's exhibits at Glasgow, 215
Medical department of the Local Government Board, 22
——— Officers of Health Society of, 350, 401, 453, 503, 557, 572, 599
Merchant Shipping Act, prosecution under, 424
Meriden rural, Sanitary Inspector's report, 81
Merthyr Tydfil, Medical Officer's report, 562
Meteorological observations at Rio Janeiro, *rev.*, 38
Metropolis, cholera hospital for the, 120
——— drainage law of the, 107
——— mortuaries for the, 308
——— sewerage and main drainage of, 614
Metropolitan Board of Works and artisans' dwellings, 448
——— Local Government Officers' Association, 19
——— Public Gardens and Playgrounds Association, 232, 374, 470, 571, 616
——— sanitary administration, Dr. T. O. Dudfield on, 235
——— ——— precautions, 125
Meura's (Belgium) stoves, 30
Michigan, recent health legislation in, 22
Middle-class dwellings, Mr. H. C. Burdett on, 168; discussion on, 198
Middlesex and Hertfordshire combined district, 323
Milch cows, model stables for, 614
Milk adulteration, 21, 607; at Birmingham, 550; cost of, 591
Milk Company, First Swiss Alpine, 127
—— dissemination of disease by, 93
—— supply of Birmingham, 450
—— warranty as to quality of, 306
Milks, comparative value of, 258
Milton urban, sanitary authority and the homes of the poor, 422
Mirth hygienic, value of, 23
Mixing and chopping machine, 371
Model dwellings, 571
——— stables for milch cows, 614
Monckton's (Mr.) Sanitary Inspection Bill, 424
Moncrieff, Mr. W. D. Scott, on a remarkable case of bad drainage, 485
——— ——— on the use of cast iron for drains, 1
Monin, Dr. E., La propreté de l'Individu et de la Maison, *rev.*, 639
Monmouth rural, Medical Officer's report, 79
Morgan's enamelled slate mantelpieces, 315
Morrison's improvements in lavatories, baths, &c., 370
Mortality, British urban, 352
——— high, at Preston, 530
——— in prisons, 307
——— recent, in European capitals, 21
——— records, past and present, 398
Mortuary at Paddington, 127
——— public, for Camberwell, 297
Mortuary regulations, 550
Mortuaries, 357
——— for the metropolis, 308
——— on the banks of the Tyne, 569
Moule's earth-closets, 516
Moye's exhibits at Glasgow, 206
Muir & Ewing's exhibits at Glasgow, 210
Mulhausen, workmen's dwellings at, 309
Municipal Code, English, *rev.*, 372
——— Corporations Act, *rev.*, 372
Murphy, Mr. Shirley, on the etiology of enteric fever, 121
Musgrave's stoves, 30
Mushrooms, cultivation of, 258
Myers' water-closet, 276

National Health Society, 392, 454, 591
——— ——— ——— and Sanitary Aid Committee, 351
——— ——— ——— Exhibition list of prize-takers, 30
Nationalisation of water supply, 297
'Nautilus' grate, 317, 522
Naval and military sanitation, 150
——— Hygiene, Dr Reincke on, *rev.*, 88
Nawrocki's apparatus for treatment of fæcal matters, 274
Neilson's sanitary fittings, 208
Nelson's smoke-consuming grate, 414
New Acts of Parliament, 116
Newcastle and Gateshead Water Company, 605
——— baths and washhouses, 593
——— contamination of water supply at, 447
——— excessive death-rate at, 95, 142, 231, 245, 310, 392, 437
——— extension of Elswick Park, 232
——— improvements at, 65
——— Infirmary and small-pox, 524
——— new infectious diseases hospital at, 232, 540
——— Medical Officer's report, 562
——— mortality of, 386
——— Sanitary Inspector's report, 34, 519
——— scarlet fever at, 549
——— unhousing of the poor at, 523
——— Workhouse, 143
New food, a, 186
New Forest rural, Medical Officer's report, 324
New hospitals abroad, 145
——— at Rome, 94
Newington, Medical Officer's report, 32
New inventions, 84, 136, 223, 276, 326, 467, 522, 566, 610
Newman's traps, 520
Newton Abbott, Dawling, and Wolborough, Medical Officer's report, 324
——— ——— rural, Sanitary Inspector's report, 81
New York, building in, 259
——— need of new parks for, 615
——— summer corps, 66
——— water supply insufficient at, 489
Nice, International Exhibition at, 41
Nicholl's deodoriser, 36, 278
Nineteenth Century Building Society, 615
Nobes' domestic fire-engine, 278
—— deodorising and disinfecting apparatus, 137
Noisy or offensive trades, 557
Noot's drain-pipes, 137
North British Association of Gas Managers, 73
——— Eastern Sanitary Inspectors' Association, 77
——— Western Association of Medical Officers of Health, 263
Notes and Queries, 46, 96, 148, 234, 332, 378, 426, 470, 526, 574, 620
Notices of meetings, 95, 146, 233, 284, 330, 376
Nursing schools and the future of nursing, 536
Nuisance from cows on footpath, 46
——— ——— drains, 107
——— ——— repression, 12
Nuisances, abatement of, 472
——— ——— caused by two or more persons, 14
——— ——— information as to, 13
——— ——— legal proceedings, 14, 88
——— ——— outside districts, 14
——— ——— power of entry, 15
——— ——— service of notices, 14

Objections to cesspools, 332
Obstruction of street, 373
Offensive businesses, and discussion, 503
Okehampton rural, Medical Officer's report, 79
Ornamental burial grounds, 40
Open spaces, 40, 94, 146, 232, 283, 329, 374, 423, 470, 523, 571, 615
——— ——— and recreation grounds in London, 320
—— street doors and the supervision of tenement houses, Miss E. P. Bullar on, 55
Organisation of convalescent aid, *rev.*, 611
'Otto' silent gas engine, 590
Outcast Windsor, 374
Outlets, 488
Overcrowding, 146, 458; a remedy for, 595; powers of entry, 46
Overflow-valve for wash-basins, Cooper's, 37
Over-pressure in schools, 549

Paddington, Medical Officer's report, 562
——— ——— Park Committee, 329
——— ——— vestry and public lavatory accommodation, 463
Page, Dr. H., how can the present insanitary condition of the poor be remedied? 379
Pagliani, Prof., Sull' Eziologia dell' Epidemia di Febbri Tifoide in Parigi, *rev.*, 39
Paris, building regulations in, 399
——— inspection of furnished rooms in, 429
——— lodging-houses, sanitary regulations of, 422
——— rainfall and enteric fever, *rev.*, 39
——— thoroughfares and wood-paving, 614
——— water-supply, 122
Park, Dr. R., on the health effects of the Education Act and sanitation of watering-places, 613
Parkes Museum, 407, 572
Parks and open spaces, 40, 94, 146, 232, 283, 329, 374, 423, 470, 523, 571, 615
——— need of, for New York City, 615
Parochial election, 87
Patent Borax Company, 281
Patents, American. (*See* American)
——— for sanitary inventions, 299
——— sanitary. (*See* Sanitary)
Pauper, what is a, 449
Paving expenses and the Local Government Board, 88
——— ——— law in respect to, 87, 332
Peabody fund, 408
Peason's 'twin' closets, 507
Pellier's sewer trap, 604
Pendleton, public baths at, 463; public playgrounds at, 616
Penny dinners for school-children, 578
——— water-purifier, 125
Pennycook Patent Glazing and Engineering Co., 210
Penzance and the dwellings of the poor, 422
——— Medical Officer's report, 563
Penzo's exhibit at Amsterdam Exhibition, 29
Pepper dust, 259
Percival, Mr. G. H., on the notification of infectious diseases, 394
Perfumes, sanitary use of, Mr. Eugene Rimmel on, 457: Mr. C. T. Kingzett on, 493
Periwinkles, poisoning by, 355
Personne's (Brussels) exhibits at Amsterdam Exhibition, 29

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Pettenkoffer on the electric light in theatres, 125
——— probability of an invasion of cholera in Europe, 47
Pfleiderer's universal kneading and mixing machine, 315
Pietsch's stench-trap, 137
Pike's traps, 83
Pipe-joint packing, Bride's American patent, 276
Pixene, 226; soap, 226
Playgrounds for children, 374
Playter, Dr. E. (Toronto), on vaccination, 64
Pleasures of house building, 574
Plumbers' (Master) Association (Philadelphia), 524
Plumbers' trap, Clarke's patent, 462; Du Bois' patent, 604
Plumbing, 308
Plumbing and disease, editorial notice, 19
Plymouth, workmen's dwellings in, 258
Pneumokoniosis, Dr. Birch Hirschfeld on, *rev.*, 90
Poisoning by diseased meat, 124, 256
——— periwinkles, 355
Poisonous fungus in dried cod, 501
——— wall papers, 125, 397
Pollution of rivers, 620
——— stream, 373; wells, 447
Poor Law Conferences Act, 117
——— the Rev. T. W. Fowle, M.A., on, *rev.*, 371
Population, decline of, 351
——— statistics in Scandinavia, 259
Pork, American, 555
Port of Liverpool, Medical Officer's report, 324
——— London, Sanitary Committee, 613
Powers of entry in cases of overcrowding, 46
——— highway board, 466
Precautions against cholera, 120
——— disease, 183
——— fire at public institutions, 313
Preservation of meat, 517
President of the Local Government Board, 123
Preston, high mortality at, 550
Prevalence of tubercular disease, 398
Price and Co.'s stoneware pottery, 315
'Princess Louise' coil grate, 516
Prisons and hospitals, American, sanitary condition of, 540
——— mortality in, 307
Private Acts, 118
——— Bill legislation, 497
——— powers and public health, 254
Privies, emptying of, 234
Prohibition of trichinous meats, 398
Prospective sanitary legislation, 388
Public baths and washhouses, 283
—— buildings ventilation, 390
—— gardens and recreation grounds, 615
—— Health Act, alleged breach of, 464
—— ——— (support of sewers) Amendment Act, 117
—— ——— and private powers, 254
—— ——— in urban districts, 24, 69, 126, 261, 311, 358, 400, 451, 502, 555, 597
—— Sanitary Inspectors' Association, 77
—— town improvements, 557
—— washhouses, lavatories, and swimming-baths, Lord Brabazon on, 432
Putnam's water-closets, 463

Quarantine Dr. Reincke on, *rev.*, 83
Queries, a batch of, 472
Questions affecting owners of property and dwellers in towns, 557
——— for examination of Inspectors of Nuisances, 46
——— ——— ——— surveyors, 45
——— in plumbing (New York Trade Schools), 46

Rabagliati, Dr., on the effects of the present educational system on the physical condition of children, 527
Rags and small-pox, 592
Railway facilities for artisans, 590
Rain water cut-off, Lemle's patent, 82
——— ——— pipes, 110; disconnection of, 349
Raitt's water-waste preventers, 521
Rate, 466
Rates appeal, 87
Rating of railway, 373
Rating of unlet land, 466
Ravenstein's exhibits at Amsterdam, 27
Rawmarsh, high death-rate at, 65
Reach's patent joint-wiper, 38
Read, Mr. R., on the ventilating of sewers and house drains, 114
Reasons against the Metropolitan Board of Works Further Powers Bill, *rev.*, 564
Recovery of cost of maintenance of patient in hospital, 61
Recreation for the people, 307
——— ground at Newton (Devon), 94
——— grounds in London, 320
Redditch, Medical Officer's report, 79
Redhill and Earlswood Commons, 470
Refuse disposal in Nottingham, 364
——— removal in Demerara, 66
——— ——— of, 62
——— ——— ——— Sedgwick's patent for, 602
Registrar-General's Quarterly Returns, Mr. J. H. Shoveller on, 112, 302, 445, 544
Regulation for lodging-houses, 494
Reincke, Dr., on Naval Hygiene, *rev.*, 88; on Quarantine, *rev.*, 88
Relations between geology and sanitation, Mr. W. Eassie on, 151
Removal of refuse, 62
Renk, Dr. F., Hygienische Tagesfragen, II., *rev.*, 91
Report, annual, of the Board of Health of Bukarest, 141
——— ——— ——— ——— the state of Louisiana, 140
——— of the Leeds School Board on overstrain critically examined, 578
——— ——— Mansion House Council on the dwellings of the poor, 506
——— ——— Medical Officer of Health of the Local Government Board, 586
Reports of Medical Officers of Health:—
Aston Manor, by Mr. May, 78
Aston (rural), by Dr. Hickinbotham, 134
Aylesbury (rural), by Dr. H. Hilliard, 460
Bacup, by Dr. Brown, 78
Barnsley (rural), by Dr. Sadler, 78
Bath, by Dr. Brabazon, 134
Beccles, by Mr. Crowfoot, 31
Bedford (urban and rural), by Dr. Prior, 321
Bermondsey, by Dr. Dixon, 559
Bradford, Yorks, by Mr. Butterfield, 559
Brandon and Byshottles, by Mr. Blackett, 134
Builth (rural), by Mr. Herring, 321
Calcutta, by Dr. McLeod, 559
Calverley (urban), by Mr. Giddings, 411
Carlton (urban), by Mr. Knight, 32
Carmarthen (urban), by Mr. Hughes, 78
Carnarvonshire, by Mr. Rees, 461
Chailey (rural), by Mr. Graveley, 411
Cheltenham, by Dr. Wright, 322
Chester-le-Street (rural), Harrington Division, by Mr. Jackson, 322
Cleator Moor, by Dr. Eaton, 411
Coventry (urban), by Dr. C. Fenton, 322
Dover (urban), by Dr. Robinson, 32
East Dereham, by Mr. Bird Vincent, 411
Epping (rural), by Mr. Fowler, 559
Featherstone, by Mr. Buncle, 560
Frome (rural), by Mr. Parsons, 134
Gateshead, by Mr. Green, 322
Georgetown, by Mr. Hill, 560
Gloucestershire combined district, by Dr. Bond, 323
Guildford (rural), 560
Halifax (urban), by Mr. Ainley, 134
Handsworth, by Dr. Welch, 79
Hanley, by Dr. Walker, 560
Hartismere (rural), by Dr. Barnes, 461
Hastings, by Mr. Knox Shaw, 135
Hebburn, by Mr. Sweet, 461
Helmsley (rural), by Dr. Bruce Low, 461
Hexham (rural), by Dr. Maclagan, 561
Holme Valley (rural), by Mr. Fowle Scougal, 323
Holsworthy (rural), by Mr. Ash, 32
Hove, by Dr. Kebbell, 79
Huddersfield, by Dr. Cameron, 561
Ipswich, by Mr. Elliston, 561
Islington, by Dr. Tidy, 561
Keighley (urban), by Mr. Roberts, 323
Kettering, by Mr. W. Dryland, 135
King's Norton (rural), by Mr. Hollinshead, 461
Lancaster (urban and rural), by Mr. Harker, 561
Leicester, by Dr. Johnson, 323
Limehouse, by Mr. Rogers, 562
Liversedge, by Dr. Shires, 562
Lytham, by Dr. Fisher, 562
Merthyr Tydfil, by Mr. Dyke, 562
Middlesex and Hertfordshire combined district, by Dr. Saunders, 323
Monmouth (rural), by Dr. Wilkis, 79
Newcastle-on-Tyne, by Mr. H. E. Armstrong, 562
New Forest (rural), by Mr. Jenkins, 324
Newington, Dr. Iliff, 32
Newton Abbot, Dawlish, and Wolborough, by Mr. L. Armstrong, 324
Northampton, by Mr. Lee Cogan, 411
Okehampton (rural), by Mr. Ash, 79
Paddington, by Dr. Stevenson, 562
Penzance, by Mr. Millett, 562
Port of Liverpool, by Dr. S. Taylor, 324
Redditch, by Mr. Page, 79
River Tyne Port, by Mr. Armstrong, 33
Romford (rural), by Dr. Wright, 324
Rotherham (urban), by Dr. Hardwicke, 411
St. Asaph (rural), by Dr. Lloyd Roberts, 563
St. Germans (rural), by Dr. Ballard, 324
St. Marylebone, by Mr. Wynter Blyth, 325
Saltley (urban), by Mr. Creswell, 135
Sidmouth, by Dr. Pullin, 563
Stockport (rural) (Hazel Grove div.), by Mr. Moore, 411
Stockton (rural), by Mr. Blandford, 325
Stretford, by Mr. Pettinger, 79
Stroud (rural and urban), by Mr. Partridge, 135
Sunderland, by Mr. Harris, 563
——— Port, by Mr Harris, 126
Taunton (urban and rural), by Dr. Alford, 563
Tendring (rural), by Dr. Cooke, 564
Todmorden (urban), by Mr. Thorp, 136
Torquay, by Mr. Karkeek, 79
Walker-on-Tyne, 80
Watford, by Dr. Brett, 412
Wellington (Somt.), by Dr. Meredith, 33
Whitechapel, by Mr. Liddle, 564
Williton (rural) (Western div.), by Mr. Clark, 325
Windsor, by Dr. Casey, 80
Withington (urban), 136
Wolstanton and Burslem (rural), 136
Reports of Sanitary Officers for:—
Aston (rural), by Mr. Deeks, 33
Bath (urban), by Mr. Montague, 33
Bedford (rural), by Mr. Adams, 80
Bournemouth, by Mr. O'Connell, 80
Bradford (Yorks), by Mr. Chambers, 518
Bury, by Mr. Wilkinson, 33, 518
Chepstow (rural), by Mr. Williams, 325
Chipping Sodbury (rural), by Mr. Adams, 325
Cirencester (rural and urban), by Mr. Harmer, 325
Coventry, by Mr. Booker, 80
Derby, by Mr. Clarke, 518
Dursley (rural), by Mr. Robinson, 325
East Barnet Valley (urban), by Mr. Rumble, 325
East Dereham (urban), by Mr. Nankivell, 325
Gloucester (rural), by Mr. Weaver, 325
Govan, by Mr. McKay, 518
Halifax (urban), by Mr. Travis, 80
Handsworth (urban), by Mr. Loach, 33
Harborne (urban), by Mr. Newey, 81
Hastings by Mr. Inskip, 33
Hebburn, by Mr. Waugh, 81
Hemel Hempstead (rural), by Messrs. Flint and Banbury, 326
Hendon (rural), by Mr. Woodbridge, 326
Hereford (urban), by Mr. Bridgewater, 34
Hove, by Mr. King, 34
Jarrow, by Mr. Batey, 518
Keighley (urban), by Mr. Holmes, 326
Kings Norton (rural), by Mr. Clarke, 519
Ledbury (rural), by Mr. Dingley, 34
Leek, by Mr. Farrow, 81
Luton (urban), by Mr. Jerrard, 34
Lytham, by Mr. Whiteside, 81
Manor of Aston (urban), by Mr. Bolt, 34
Meriden (rural), by Mr. Bretherton, 81
Newcastle-on-Tyne, by Mr. Carry, 34
——— ——— ——— Mr. T. Clarke, 519
Newton Abbot (rural), by Mr. Seager, 81
Rotherham (urban), by Mr. Parkin, 519
Rugby, by Mr. Redfern, 81
Runcorn (rural), by Mr. Farrington, 519
Saltley (urban), by Mr. Payne, 34
Samford (rural), by Mr. Kerridge, 34
Solihull (rural), by Mr. Harris, 81
Sowerby Bridge, by Mr. Whitlaw, 34
St. Albans (rural), by Mr. Comley, 34
Stockport (rural), by Mr. Sykes, 34
Stretford, by Mr. Hill, 34
Stroud (rural), by Mr. Bailey, 35
——— (urban), by Mr. Kirby, 35
Thornbury (rural), by Mr. Williams, 326
Todmorden (rural), by Mr. Blackburn, 35

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Reports of Sanitary Officers for :—
Torquay, by Mr. MacMahon, 35
Tring (urban), by Mr. Baines, 81
Walker-on-Tyne, by Mr. Myers, 35
Warwick, Southam, and Kenilworth, by Mr. Trepess, 81
Watford (rural), by Mr. Heath, 81
——— (urban), by Mr. Williams, 326
Welwyn (rural), by Mr. Pearce, 325
Weobley (rural), by Messrs. Lloyd and Vaughan, 35
Report on children's holiday colonies at Frankfort-on-the-Main, *rev.*, 609
Richardson, Dr. B. W., on felicity as a sanitary research, 199
Richmond and its water supply, Mr. G. Phillips Bevan on, 97
Rimmel, Mr. Eugene, on the sanitary use of perfumes, 457, 569
Rio Janeiro, Bulletin astronomique de Météorologique de l'Observatoire Impérial de, *rev.*, 38
River pollution, Mr. Henry Robinson on, 165
——— Tyne port, Medical Officer's report, 33
Rivers pollution, 256, 288, 620
Roberts's exhibits at Glasgow Exhibition, 210
Robertson's exhibits at Glasgow Exhibition, 210
Robins, Mr. E. C., on the disabilities of inspectors of nuisances and their remedy, 176
——— discussion on, 195
Robinson, Mr. Henry, on river pollution, 166
Roman crematorium, 617
Rome, new hospital at, 94
Romford rural, Medical Officer's report, 324
Ross's suction-valve, 205
Rotherham Union, Medical Officer's report, 411
——— urban, Sanitary Inspector's report, 519
Royle's radius valve, 29
Rugby, health of, 62
——— Sanitary Inspector's report of, 81
Runcorn rural, Sanitary Inspector's report, 319
Russell's new water-tap, 227

Salaries in Cornwall, 19
Salter & Company's exhibits at Amsterdam, 29
Saltley urban, Medical Officer's report, 135
——— ——— Sanitary Inspector's report, 34
Sandford rural, Sanitary Inspector's report, 34
Sanitary aid and dwellings committee, by Miss Toynbee, 335
——— committees, 450
——— ——— ——— and the National Health Society, 351
——— anticipations and suggestions, 367
——— arrangements of houses, defects, and their remedies, 7
——— aspects of house construction, 164
——— assurance association, 507, 570
——— authorities, local, proposed extension of powers of, 60
——— broad streets, 355
——— closet receptacles, Lawton's patent, 369
——— compensation for disturbance, 120
——— condition of Birmingham workshops, 552
——— ——— ——— some American prisons and hospitals, 540
——— ——— ——— watering places, 551
——— doings of the month, 312, 459
——— influence of games in English schools, 596
——— inspection, 424
——— inspectors, hints to, 12, 105, 247, 349, 486
——— ——— ——— public association of, 257, 362, 407, 601
——— ——— ——— tenure of office of, 298
——— Institute, 31, 45, 46, 76, 286, 330, 617, 620
Sanitary Institute of Great Britain, report of the Proceedings :—
Section of Sanitary Science and Preventive Medicine.—Address on the Prevention of disease. By Professor Gairdner.—Cholera Epidemics. By Dr. Christie.—Typhoid Fever. By Dr. J. F. Sutherland.—Discussion, 193
Section of Engineering and Architecture —Paper on London Dwellings. By Professor Roger Smith, F.R.I.B.A.—Discussion, 194
Dr. B. W. Richardson on Felicity as a Sanitary Research, 195
Section of Chemistry, Meteorology, and Geology.—Dr. Angus Smith, F.R.S., on Air as a Sanitary Agent.—Mr. W. R. E. Coles on Smoke Abatement.—Dr. Wallace on Comparative Merits of Coarse and Fine Flour.—Dr. Adams on Disinfection by Heat.—Closing General Meeting.—Dinner, 200
Dr. Alfred Carpenter's Lecture to Working Men, 203
List of Awards, 221
Sanitary inventions, patents for, 299
——— jottings, 39, 95, 142, 231, 283, 329, 374, 424, 470, 560, 613
——— journal (Toronto) on vaccination, 64
——— law hints on, by Mr. G. F. Chambers, *rev.*, 565
——— lectures to working men, 207
——— legislation, prospective, 388
——— literature, cheap, for the people, 329
——— notes, 21, 65, 122, 410, 517
——— Paint Company, 205, 431, 513
——— paints, 566
——— patents (illustrated), 35, 82, 137, 273, 368, 412, 462, 519, 602
——— powers under by-laws, 107
——— progress in Japan, 591
——— regulations, 107
——— reports. (*See* Reports.)
——— Science Examinations at Cambridge, 122, 233
——— sermon, a, 283
——— state of Ventnor, 593
——— statistics at Whitehall, 594
——— supervision of bakehouses, 530
——— use of perfumes, 457, 569
——— work, ten years of, 552
Sanitas Company's exhibits, 211, 226, 491
Sanitation and geology, relations between, 51
——— economics of, 258
——— general, 154
——— of ships, 312
Scandinavia, popular statistics in, 259
Scarborough, brawn poisoning at, 595
Scarlet fever at Blaydon, 329
——— ——— Newcastle, 614
Scavenging, law of, 465
——— of towns, Mr. John Young on, 190; discussion on, 198
School furniture, Hodkinson and Clarke's, 513
Schools, hygiene of, in America, 104
——— over-pressure in, 549
Science and art classes at Liverpool, 233
Scottish Veterinary Association, 132
Sedgwick's apparatus for the removal of refuse, 602
Sediment trap, Hawes' patent, 35
Servia, sanitary services in, 609
Sewage, purification of, 284
——— trap or gully, Green's patent, 138
——— Young's patent for the treatment of, 35
Sewer, accident to, 87
——— flushing apparatus, Vibbard's patent, 138
——— furnace hygiene, 417
——— gas and disease, 498
——— ——— excluder, 314
——— ——— trap, Cassel's patent, 82
——— ——— Williams's American patent, 82
——— inlet, Collins and Pike's patent, 275
——— or stench trap, Craig's, 83
——— trap, Bodine's patent, 604; Pellier's patent, 604; Stewart's patent, 139
——— traps, 249
Sewers, 486; law in respect to, 466; ventilating of, by Mr. G. F. Harrington, 250
——— and house drains, 309
——— ventilation of, 595
ewerage and main drainage for the metropolis, 614
——— of Frankfort, 251, 328
——— works, mandamus to compel, 574
Shaftesbury, Earl, on the housing of the poor, 615
Shanks' combination bath, 206
Shaw prize, the, 377
Shaw & Milan's patent for sewers, 275, 412
Sheffield Health Committee, 142
——— household suffrage in reference to sanitation, 395
——— main drainage system, 614
Shillington & Harrison's improvements in stoves, 412
Ships, sanitation of, 310
Shone's ejectors, 506
Shoveller, Mr. J. H., on the Registrar-General's Quarterly Returns, 112, 302, 445, 544
——— ——— ——— urban mortality in 1883, 352
Sick room nursing and first aid, lectures on, 233
Sidmouth, Medical Officer's report, 563
Silber Light Company's award, 471; food warmer and night light, 467
Silicate Zopissa Paint Company's exhibits, 315
Silicated carbon filter, 370
Sink, Talpey's American patent, 138
Sinks, disconnection of, 349
——— scullery, disconnection of, 350
Slater, Mr. John, on building materials, 3, 100, 441
Slaughter-houses and butchers' shops, 308
Small-pox, 614
——— ——— and infected rags, 550
——— ——— ——— sociability, 65
——— ——— ——— vaccination, 594
——— ——— at Blaydon, 491
——— ——— Gateshead, 142
——— ——— Newcastle, 524
——— ——— Wallsend, 142
——— ——— how it is spread, 375
——— ——— in London and public vaccination, 546
——— ——— Madras, 524
——— ——— spread through a school, 593
——— ——— outbreak of, at the East End of London, 534
Smith, Dr. Angus, on air as a sanitary agent, 154
——— ——— ——— the late, 553
——— Mr. H., fresh fields and pastures new, 93
——— Professor Roger, on London dwellings, 195; discussion on, 196
Smoke abatement, 122, 505, 591
——— ——— ——— actions, 86, 390, 470
——— ——— ——— Mr. W. R. E. Coles on, 181; discussion on, 201
——— ——— ——— Mr. Ernest Hart on, 271
——— ——— ——— and anthracite coal, 272
——— ——— ——— Institution, 174
——— consuming in furnaces, apparatus for, 358
——— escape of, into rooms, 487
——— nuisance and public buildings, 375
——— ——— ——— in manufacturing towns, 306
——— ——— ——— prevention in Chicago, 374, 489
——— testing for drains and air currents, Mr. Buchan on, 612
Smokeless furnace, American, 275
Sociability and small-pox, 65
Social Science Association, 146
Society, Cremation, 455
——— ——— ——— in New Orleans, 616
——— ——— ——— ——— York, 616
——— ——— ——— ——— England, 571
——— for Enforcement of Sanitary Laws and Improvement of Dwellings, 469
——— ——— Promoting Window Gardening, 40
——— Kyrle, 40, 94, 523
——— Liverpool Engineering, 506
——— National Health, 390, 454, 591
——— Nineteenth Century Building, 615
——— of Arts, 145, 424
——— ——— Medical Officers of Health, 233, 359, 401, 453, 503, 557, 572, 599
——— Statistical, 231, 234, 470
Soil and waste pipe, 109
Solihull rural, Sanitary Inspector's report, 81
Southam Sanitary Inspector's report, 81
South Metropolitan Dairy Company, 567
Southport, Dr. Wright on, 171
Southshields and the fumes from alkali works, 234
Southwark poor, the homes of, 408, 422
Sowerby Bridges, Sanitary Inspector's report, 34
Spencer, Herbert, on the Building Laws, 605
——— Mr. J. P., on the disposal of house refuse, 252
Spigot, Evans's American patent, 604
Spottiswoode, the late Mr. W., 393, 437
Spread of small-pox through a school, 593
St. Albans rural, Sanitary Inspector's report, 34
—— Asaph rural, Medical Officer's report, 563
—— Faith guardians and rural sanitary authority, 39
—— German's rural, Medical Officer's report, 324
—— Marylebone, Medical Officer's report, 325
Stamford's exhibits at Glasgow, 216
State control for chronic inebriates, 452
—— Sanitary Department, a, 149
Statistical Society, 232, 284, 470
Statistics, French vital, 356
——— sanitary, at Whitehall, 594
Steam, disinfection by, 84
—— power washing machinery, 86
Stench trap, Ayres' patent, 521

Digitized by Google

Stench trap. Manock's patent, 520
——— Pietsch's patent, 139
Stevenage and its water supply, 614
Stewart, Mr. James, on the testing of drain and other pipes, 184
Stewart's exhibits at Glasgow, 207
——— sewer trap 139
Stockport rural, Hazelgrove div., Medical Officer's report, 411
——— Sanitary Inspector's report, 34
Stockton rural, Medical Officer's report, 325
Stoddart, Mr. J H., on the rehousing of outcast Glasgow, 204
Stonehouse Royal Naval Hospital, 729
Storm overflow sewer for South London, 614
Storms, influence of, upon water traps. 40, 94
Stoves, German *v.* English fireplaces, 328
——— Shillington's improvements in, 412
Strand Building Company, 422
Stratton, Rev. J. Y., on hops and hop-pickers, *rev.*, 466
'Strawfena' cigarettes, 228
Street paving, 373
—— scavenging, 190
Streets, law in respect to, 88
Stretford, Medical Officer's report, 79
——— Sanitary Inspector's report, 34
Stroud rural and urban, Medical Officer's report, 135
——— ——— ——— Sanitary Inspector's report, 35
Summer health resorts, 500
Sunderland, a Sanitary Inspection Association at, 142
——— Medical Officer's report, 563
——— Port, Medical Officer's report, 136
——— proposed industrial exhibition at, 524
Supervision of dairies, 24
——— tenement houses, 63
Sutherland, Dr. J. F., on typhoid fever, with discussion, 144
Swalwell, insanitary conditions at, 523
Swedish gymnastics, 483
Swee's, hygenic, 522
Swimming-bath for Whitechapel, 589
Syers' water-waste preventing valve, 512

Tapley's sink, 138
Taunton, Medical Officer's report, 563
Taylor & Co.'s exhibits at the Amsterdam Exhibition, 20
Taylor's patent for leakage in pipes, 413
——— (Mr. P. O.) vaccination motion, 19
Tea and coffee, Dr. Binz on, *rev.*, 89
Tea kettle, an improved, 371
Teale, Mr. T. Pridgin, the report of the Leeds School Board on over-pressure critically examined, 578
Teignmouth Local Board, 28
Tendring rural, Medical Officer's report, 564
Tenement houses, supervision of, 63
——— ——— ——— and open street doors, Miss E. P. Bullar on, 55
Tenure of office of Sanitary Inspectors, Mr. E. S. May on, 293
Ten years' sanitary work, 552
Terebene household soap, 226; jelly, *ib.*
Testimonials, 19
Testing house-drains, 486
——— of gas pipes, 487
Thames, the temperature of the, 21
——— valley drainage scheme, 77
Theatres, the electric light in, 125
Thirsk, defective sanitation at, 231
Thompson, Sir Henry, on cremation, *rev.*, 609
'Thompson' smoke consuming grate, 468, 611
——— Mr. Gilbert, on house sanitation in and around Glasgow, 178; on trap ventilation and syphonage, 328
——— Mr. Harcourt, on ventilation, 421, 522
Thompson's improved method of ventilating buildings, 273
Thornbury rural, Sanitary Inspector's report, 326
Thymol soap, 226
Tiles, non-absorbent roofing, Major's, 566
Tinned food, Mr. H. Masters on, 376
——— provisions, 450
Tiverton, drainage completion at, 231
Todmorden rural, Sanitary Inspector's report, 35
——— urban, Medical Officer's report, 136
Torbay Paint, 167
Torquay, housing of the poor at, 614
——— Medical Officer's report, 79
——— Sanitary Inspector's report, 35
Torrens' Act and the Marylebone authorities, 348
Tottenham Sanitary Association, 65, 551
Towns' improvement, 267
Town refuse, treatment and utilisation of, 189
Toynbee, Miss, on sanitary aid and dwellings committees, 335
Trap, Bennor's American patent, 84
——— ventilation and syphonage, Mr. Hubert on, 375; Mr. Masters on, *ib.*; Mr. Gilbert Thompson on, 328
Traps for flushing and inspecting drains, Newman's, 520
——— Pike's American patent. 83
Trapnell and Gane's artistic furniture, 315
Trapping sewers and drains, Barlow's patent, 138
'Treasure' range, 516
Tree-planting encouraged in New York, 232
——— from a sanitary point of view, 470
Trichinæ in meat, detecting, 499
Trichinosis in German pork, 558
Trichinous meat, prohibition of, 398
Tricycles in the parks, 499
Tricycling in the Alps, 51
Tring urban, Sanitary Inspector's report, 81
Tripe, Dr., on the Artisans' Dwellings Act, 333
——— ——— outbreak of small-pox at the East End, 534
Truss's water-waste preventing valve, 514
Tubercular disease, prevalence of, 308
Tuberculous animals, the flesh and milk of, 551
Tuke, Mr., on the cost of excreta disposal, 265
Turner, Mr. Ernest, on hints to house hunters and householders, *rev.*, 609
——— Mr. W. Dawson, on what to do in case cholera visits England, 111
Tweedy, Dr. H. C., on State control for chronic inebriates, and discussion, 452
Two sides to a question, 310
Typhoid fever and drain air 22
Typhus fever in Liverpool, 23
Tyler's water-waste preventer, 415
Tyne Alkali Works, 310, 375
—— Port Sanitary Authority and cholera, 143

Unhealthy dwellings prosecution, 372
Unsanitary pit village, 142
Unwholesome food, 628
——— ——— law in respect to, 88
Urinals, law in respect to, 87

Vacancies, 331, 378, 425, 471, 525, 573, 619
Vaccination and small-pox, 594
——— compulsory principle in, 19
——— distraints, 86
——— Dr. E. Playter (Toronto) on, 64
——— Mr. P. O. Taylor's motion, 19
——— prosecution, 464
——— public, and small-pox in London, 546
Vegetarianism, 463
Ventilating appliances, Aldous & Sons, 569
——— ——— Boyle's, 509
——— ——— Kite's, 508
——— ——— Lamb's, 509
——— buildings, Thompson's patent, 273
——— of sewers, improvements in, 250
——— pipe and cowl, Cooper's patent, 37
Ventilation, 147, 153, 367, 460
——— costless, 613
——— drain. 600
——— Mr. Buchan on, 468, 568
——— Mr. J. M. Lamb on, 422
——— Mr. H. Thompson on, 421, 522
——— of mines, 129
——— of public buildings, 62, 390
——— of sewers, 595
——— of sewers and house-drains, Mr. R. Reed on, 114
——— practical hints on, 487
Ventilator exhausters, Hunter's, 369
——— or chimney-cap, Irwin's, 37
Ventilators, Baker's, 35
——— Boyle's, 19, 232, 249, 509, 580
——— Ellison's, 304
Ventnor, sanitary state of, 593
Vernon's patent noiseless ware, 220
Veterinary International Congress, 95
Vibbard's sewer flushing apparatus, 138
'Victoria' dry glazing, Deards', 216
——— Stone Company's exhibits, 508
Vital statistics, French, 356
Voltmer & Co. on artificial human milk, 567

Waddell & Main's exhibits at Glasgow, 216
Wandsworth and its water supply, 398
Walker-on-Tyne, Medical Officer's report, 80
——— Sanitary Inspector's report, 35
Wall-papers and textile fabrics, poisonous, 399
——— non-arsenical, Woollams', 510
Wallace, Dr. W., on merits of coarse and fine flour, 201
Wallace, Mr. W., on some sanitary aspects of house construction, 164
Wallsend Local Board and the Local Government Board, 569
Wallsend, small-pox at, 142
Walton & Co.'s exhibits at Glasgow, 205
Waple's chimney-pots and ventilators, 520
Waring's water-closet and urinal, 37
Warm-water apparatus, Bacon's, 30
Warming and ventilating, 267
Warranty as to quality of milk, 306
Warwick, Sanitary Inspector's report, 81
Washhouses, laundries, and swimming-baths, public, 412
Water analysis, fallacies of empirical standard in, by Mr. A. Austin, 530
Water, analysis of, by Medical Officers of Health, 46
Water-closet and urinal, Waring's American patent, 37
——— apparatus, Leask's patent, 274
——— basins, McCombie & Seaman's patent, 521
——— Myers' patent, 276
——— shut off, Farthing's American patent, 83
——— splashboard for, American patent, 84
——— urinal and cesspool, Berlier's patent, 84
——— valve, McGuire's patent, 276
——— Wellington's American patent, 84
——— &c., Putnam's patent, 462
—— closets, 110, 309
——— apparatus for, Helliwell's patent, 602
——— Berwick's, 602
——— Emanuel's patent, 603
——— flushing apparatus for Austin's patent, 603
——— ——— ——— Boyle's patent, 604
——— Gilbert's, 207, 602
——— Haigh's flushing apparatus for, 414
——— in general use, Mr. D. Emptage on, 187
——— ——— discussion on, 197
——— Lickey & Hay's patent, 137
——— neglect to provide, 375
——— 'The Crown and the National,' 205
—— companies charges, 373, 570
—— examination of, 427, 479
—— powers, 87
—— proofing, hygienic, 67
—— purifier for a penny, 125
—— rates, 547, 588
——— law in respect to, 524
——— Mr. J. Vesey Fitzgerald on, 430
—— spouts to houses, 96
—— supplies in American cities, 17
—— supply, 283, 375, 569
——— action, 524
——— in Wandsworth, 398
——— insufficient at New York, 489
——— new, for Liverpool, 143
——— of London, 143
——— Paris, 122
——— Woking, 143
——— the nationalisation of, 297
——— to closets, &c., 390
—— tap, Russell's, 227
—— traps, influence of storms upon, 40, 94
Water-waste preventer, Raitt's patent, 521
——— Syer's, 512
——— Truss's, 514
—— works at Bury, 264
——— Clauses Act 1847, 472

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Watering-places, sanitary condition of, 551
Watford, Medical Officer of Health, report, 412
——— rural, Sanitary Inspector's report of, 81
——— urban, ——— 326
Watts' patent asphyxiator, 316
Wedgwood & Son's tiles, 345
Wellington (Somerset), Medical Officer of Health, report of, 33
Wellington's water-closet, 84
Wells, pollution of, 447
Wells, Sir T. Spencer, on cremation or burial, 609
Welwyn rural, Sanitary Inspector's report of, 326
Wentworth's exhibits at Glasgow, 221
Weobley rural, Sanitary Inspector's report of, 35
'Wery' (the) atmospheric cowl, 277
West Cowes water supply, 524
West's, A. J. & C., gas heating exhibits, 514
West Kent combined district, 23
What is a pauper? 449
Wheeler's exhibits at Glasgow, 221
Where to take a holiday (Holiday number of the LONDON MEDICAL RECORD), *rev*, 91
Whitechapel, insanitary dwellings in, 243
——— swimming bath at, 589
Whitehall, sanitary statistics at, 594
White lead factories on the Tyne, 231
White lead, manufacture of, 223
——— poisoning, 65, 142
Whyte & Bradford's exhibits at Glasgow, 218
Wigton sewerage works, 375
Willesden, the patent rot-proof paper, 316
Williams, Dr. Dawson, on insanitary dwellings in Whitechapel, 243
Williams' sewer gas trap, 82
Willington Quay, insanitary state of dwellings at, 523
Williton rural (Western Division), Medical Officer's report, 325
Willoughby, Dr. E. F., on baths and bathing, 434
——— on the sewerage of Frankfort, 251
Window-gardening, society for promoting, 40
Windsor, Medical Officer's report, 80
——— outcasts, 374
Winlaton sewage scheme, 434
Winter, Mr. F. B., on lodging-houses for the poor as an investment, 296
Withers (the) patent gas engine, 558
Withington urban, Medical Officer's Report, 136
Woking, water supply of, 143
Wolstanton and Burslem rural, Medical Officers' report, 136
Wolverhampton Corporation and sewage farms, 312
——— Sanitary Protection Association, 457
Wood paving for Paris thoroughfares, 614
Woollams & Co.'s exhibits at Sanitary Institute Exhibition, 205
——— non-arsenical wall papers, 510
Woollen clothing, Dr. Jaeger's, 414
Worcestershire sauce and cholera, 163
Workmen's dwellings at Mulhausen, 309
——— ——— in Plymouth, 238
——— ——— improved in Leeds, 469
Worksop Local Board and Urban Sanitary Authority, 95
Workshops in Birmingham, sanitary condition of, 552
Wright & Co., awards to, 165
——— Dr., on Southport, 171
Wright's exhibits at Glasgow, 216
——— flush cisterns, 36
Yorkshire Association of Medical Officers of Health, 130
Young, Mr. J., on the scavenging of towns, 190; discussion, 198
Young's patent for treating sewage, 36
Zenith (the) air or steam screw-propeller, 316
Zymotic diseases, 361

'THE WEEKLY EXHIBITION RECORD.'

THE WEEKLY EXHIBITION RECORD—a temporary weekly supplement of the SANITARY RECORD—contains full accounts, profusely illustrated, of the exhibits in the Health Division of the International Health Exhibition, and the principal papers read at the Sanitary Conferences organised by the Society of Medical Officers of Health, the Sanitary Institute of Great Britain, the Parkes Museum of Hygiene, the Social Science Association, and the National Health Society. The EXHIBITION RECORD is at present being published weekly, price 2*d.* to Non-subscribers, free to Subscribers. The first Number was published on May 7, and will be continued till the work of description has been adequately carried out. Publishers: Smith, Elder, & Co., 15 Waterloo Place, London, S.W.

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ORIGINAL PAPERS.

ON THE USE OF CAST IRON FOR HOUSE DRAINS.*

By W. D. Scott Moncrieff, C.E.

The materials used for the construction of house drains are practically limited to bricks, earthenware, and cast iron. The advantages of cast iron are 1, its superior strength and capacity to resist fracture; 2, the greater lengths in which it can be manufactured, and the corresponding reduction in the number of joints; 3, the greater facilities for making the joints secure by means of lead, sulphur, oxidised iron filings, &c.

The points to be considered in adopting cast iron are *a*, the available means for preserving it; *b*, the determination of the capacity and weight of the pipes; *c*, the character of the connections best suited to the material; *d*, the nature of the joints; *e*, the comparative cost. The experience of gas and water companies, in any particular neighbourhood, ought to be a guide as to the life of a cast-iron drain pipe in regard to corrosion from the outside inwards. When there is no oxide of iron in the soil through which they are laid, the destruction of the pipes from exterior rusting is so slow as to justify their use without any special means of protection. In the case of drain pipes there is no reason to exclude a good protecting medium because it is poisonous, an objection which of course holds good in the case of pipes used for the distribution of drinking water. In addition to the ordinary kinds of paint made from preparations of lead, &c., there are two methods of preserving pipes from oxidation which deserve more than a passing notice. One of these consists in coating with a preparation of tar known as Dr. Angus Smith's composition, and the other I refer to is known as the Bower-Barff process, in which the surfaces are covered with magnetic oxide produced at a high temperature in a furnace built for the purpose. In a letter with which Dr. Angus Smith favoured me a few days ago, he mentioned a temperature of 400° Fahr. as the most suitable for the application of his preparation. A certain amount of practice is required in dealing with it in order to insure the proper consistency of the material when cooled. If it has been subjected for some time to the necessary temperature, evaporation makes the residual mixture hard and brittle after cooling. To avoid this a barrel of oil must be kept at hand to mix with the composition, so as to keep it in its original proportions. If too much oil is added the coating will not be hard enough. I have arranged an apparatus consisting of a trough heated by means of gas jets for applying the mixture, but it is better, I believe, to have the pipes dipped vertically. The use of steam in a double-lined chamber appears to me would be an advantageous method of working it if the temperature of 300° Fahr. recommended in the printed circulars is sufficient. In that case a steam boiler would need to be provided, capable of standing a working pressure of 75 lbs. to the square inch.† There are several specimens of the composition shown by the North British Plumbing Company in the present Exhibition. Before coating cast iron, care should be taken that the surfaces are thoroughly free from sand and other foreign substances. A steel wire brush, circular, and provided with a long handle, is useful for scouring out the interior of pipes, and they may afterwards be wiped out with an oily cloth. I have here two specimens of Dr. Angus Smith's composition kindly lent me by Mr. Rawlinson. One of them has lain in the ground for twenty-eight years, and though the composition does not seem originally to have been very well applied to begin with, the iron is still in an excellent state of preservation. The other specimen shows the application of the protecting medium in the greatest perfection, and the test of its condition as regards consistency and temperature is to be found in the high glazing or varnish which is given to the surface of the iron when it is properly applied. The Bower-Barff process has recently been brought prominently into public notice. It consists of coating the surfaces of the iron to be preserved with magnetic oxide. There is also an exhibit of some specimens of pipes treated in this way. They were coated at St. Neots, Huntingdonshire, under the direction of Mr. Bower, to whom my thanks are due for having done so for the purpose of this exhibition. I have no doubt of the efficacy of this plan when the surfaces of the iron to be dealt with are so exposed as to be capable of thorough cleansing. The interior of cast-iron pipes require special care in this respect. The 'cores' from which they are made being of 'green sand' leave rough particles behind them which at the high temperature required for the production of the magnetic oxide must be apt, I think, to form a vitreous glazing unless the pipes are very carefully cleansed beforehand.

To return to the pipes themselves the diameter I have adopted for ordinary house drains is 5 inches. This is the same as has been recently recommended by the engineers of the London Sanitary Protection Association. In cases of considerable fall, more especially when the drain is flushed by means of a flushing tank, a velocity of flow is obtained which would be apt to tell severely upon the joints of earthenware pipes laid in cement, and considering the great sanitary importance of the rapid movement this is a point in favour of cast iron. In Lord Ducie's house in Portman Square, the sanitary arrangements of which have recently been altered by the North British Plumbing Company under the direction of the Association just spoken of, there is a direct line of cast-iron drain pipe, 5 inches diameter and 99 feet in length, with a fall of 1 in 33. The end nearest the street sewer is provided with a Kemyon air chamber floor and manhole. At the other extremity of the length of 99 feet there is a similar provision for inspection but upon a smaller scale; beyond this point a further stretch of 5-inch cast-iron drain-pipe, about 70 feet in length, passes on to the back of the premises and is provided with an 80-gallon flush tank. It is found that the velocity of flow between the two disconnecting chambers along the length of 99 feet first spoken of, is at the rate of 5 feet per second. As the drain pipe is running nearly full bore this condition of things renders it impossible that any obstruction in the shape of sewage matter can remain behind. The elements essential to the creation of sewer gas being wanting its absence from the drain is practically guaranteed. The after part of the flush, in this case, always runs

* Read at the National Health Society's Exhibition, June 5, 1883.
† If 400° F. is necessary the boiler would require to be able to stand a working pressure of 250 lbs.

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clear.* I do not think much is to be gained by making the pipes less than 5″ in. diameter and, on the other hand, a greater capacity is certainly not required for the purposes of an ordinary household. I therefore look upon it as a useful dimension for ordinary cases.

As there is an absence of hydraulic pressure in cast-iron pipes used for the conveyance of ordinary house-drainage, no extra thickness of metal is required on that account, and they may therefore be made thinner than ordinary street mains. The following is a table of the thickness and weight of pipes of different diameters suitable for the purpose.

Bore Inches	Thickness of Metal.			
—	⅜″	½″	⅝″	
4	16·1	22·1	28·3	lbs. per foot.
5	19·8	26·9	34·4	,, ,,
6	23·4	31·9	40·6	,, ,,

In practice, I believe, pipes 5-16ths of an inch in thickness are sufficient for drainage purposes, and this would give about 100 lbs. as the weight of a 6 ft. length of pipe, 5 in. diameter.

Among the various kinds of joints that known as the 'socket joint' appears to me to be the best suited for iron house drains, and although the pipes themselves may be made lighter than main pipes, the socket should not be reduced in weight or strength because they are subjected to the same strain from the staving of the lead. Great care should be used in this respect, the more so as workmen may be employed who are not so experienced as those in the service of water companies.

A joint has been brought under my notice which has been patented by Mr. Eaton, C.E. It is intended for the use of Spence's metal or sulphur, and consists of an eccentric ring with a pouring hole on its top side. This overlaps the joint on both ends, and would be useful I think where it was required to insert a length of pipe between two already in position, as this could be done without the necessityof lifting more than the piece which was to be removed.

The North British Plumbing Company have carried out work upon the plan shown at the National Health Society's Exhibition under my direction for Mr. Wills, M.P., in his house at Hyde Park Gardens. The cast-iron air chamber floor which was exhibited is an effort to simplify the arrangement now so frequently adopted with advantage of having a manhole with a floor composed of half pipes as a channel for the passage of the sewage and a trap beyond it to cut off the drain from the main sewer. In the cast-iron substitute for this appliance the mouth of the trap is practically extended so as to form a floor for the manhole in itself, and this extension has the advantage of affording a provision for side inlets for the passage of surface water and for other purposes. At the same time provision is made for a cleansing eye towards the sewer which is fitted with a brass plug.

* The formulas which are commonly used for calculating the velocity of water in pipes running full must be considerably modified for the flow of house-drainage in 5-inch pipes. Taking

$$V = 140\sqrt{rs} - 11\sqrt[3]{rs}$$

in which r is the hydraulic mean depth in feet, and s the line of the inclination, the rate of flow in the case of Lord Ducie's house drain, already spoken of, in which the length approximately was 99 feet and the fall 3 feet, the velocity should have been at the rate of 6·22 feet per second. The difference between this and 5 feet is what is due to the pipe not running full, and further allowance must be made for the character of the discharge.

At the further or house end of the drain, instead of building a shallow manhole a cast-iron terminal is provided which is easily accessible and made secure by means of a similar plug to the one in the front just spoken of. In making a connection between a lead soil pipe and an iron socket, it is well to have a strong copper piece with a brazed lap seam slipped over the lead pipe and securely soldered to it. This allows for an oakum and red lead joint to be made with sufficient substance to admit of caulking.

As regards the comparative cost of iron and earthenware for house drains, it must be borne in mind that a great proportion of the total expense of lifting an old drain and laying a new one is common to both systems. For instance the cost of excavating, filling in, and making good is practically identical. The time occupied in making good the joints of an earthenware drain is as six to one as compared to an iron drain, the number of joints being as three to one in the case of 2 feet lengths of stoneware, and 6 feet lengths of iron, and I consider the time occupied in each as two to one in favour of the metal. This nearly balances the extra cost of the material. The connections, including the air chamber floor, are more costly than earthenware, but this, in the case of an ordinary London house drain should not amount to more than 5*l.* in all. I think that the greater security to be obtained from the use of cast iron quite justifies the expenditure of the additional cost, and this will hold good so long as cast iron is to be obtained at its present price.

I shall now say a few words about the other kinds of materials used for house drains, omitting bricks as obsolete. The practical objections to the use of earthenware pipes are, 1st, their liability to twist in firing. (Mr. Ernest Turner, in his excellent book 'Hints to Househunters,' speaks of having rejected as many as 60 per cent. of pipes 'sent from well-known manufacturers'); 2nd, their liability to fracture. Concussion, without fracture of the surface, is often sufficient to detach a branch piece from a pipe in which the material seems to be continuous, although the connection is often secured by little or nothing but the glazing. As such a contingency may delay a squad of workmen for several hours until another pipe and branch has been obtained, there is a temptation to make use of defective pipes. Experience shows that workmen are not above yielding to the temptation of concealment. Broken bends and bad connections are frequently found in places which are most available for the passage of sewer gas into a dwelling. 3rd. The short lengths in which earthenware pipes are made necessitate an excessive number of joints in order to make up the length of an ordinary house drain. The joints when made with clay are inefficient, and when made with cement are subject to many drawbacks which nothing but great and uncommon pains on the part of the workmen can overcome. The projection of cement to the interior of the joint is a necessary condition, and this must be removed. In doing so the pipe is liable to movement during the critical period when the cement is setting. The position of a pipe at the bottom of a deep cutting renders it difficult to pack the joint from the bottom. Only a small proportion of earthenware house drains are found to be tight when tested with a pressure of even a few inches head of water. These are among the considerations which have led me to adopt iron in preference to other materials, and I shall be glad if this paper has the effect of calling further attention to the subject.

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BUILDING MATERIALS.

By John Slater, B.A.

Fellow of the Royal Institute of British Architects.

II.—Bricks and Mortar.

The geological nature of a country always determines the character of its buildings. Where good natural building stone is abundant it is sure to be quarried and used, but where this does not exist recourse is had to some artificial material which will take its place. The material which has been more extensively used than any other is brick, the manufacture of which dates from the most remote antiquity of which we have any record.

Herodotus relates that the walls of Babylon were constructed of this material, and there are numerous very interesting pictorial representations of brickmaking and brick-laying in the hieroglyphic literature of ancient Egypt which has been preserved to us in stone blocks and mural tablets. Moreover, the existing ruins of some of the most ancient monuments of Egypt have enabled modern explorers to obtain specimens of bricks which must be several thousand years old, the great care taken in their manufacture and the extreme dryness of the climate having tended to preserve them. For instance, there is at Memphis a pyramid still partially standing built entirely of brick, and it is very probable that this was erected by Asychis, who succeeded the son of Cheops, the builder of the Great Pyramid. It is probable that burnt bricks, such as were used in this pyramid, were the exception, and that Egyptian bricks were for the most part sun-dried only, nearly all the common dwellings being constructed of this material, but burnt bricks were occasionally used.

In Assyria, also, sun-dried bricks were very largely used, the huge mounds upon which the palaces were erected being thus built, and the walls of the palaces themselves having a brick backing faced with alabaster. But the recent researches of M. Botta and M. Victor Place have resulted in the discovery of some admirable examples of Assyrian brickwork of burnt bricks, the most interesting being the arched gateway of the entrance to the palace of Khorsabad, which, both in materials and execution, would do no discredit to the best modern builder. The archivolt of this gateway is formed of wedge-shaped burnt bricks, which are enamelled in six different colours.

Vitruvius mentions three kinds of bricks as having been used by the Greeks, called didoron, tetradoron, and pentadoron; these differed only in size, and were more like tiles than our bricks. The two latter kinds were square on plan, and Vitruvius says that those called tetradoron were used for private buildings, the others for public. Roman bricks differed considerably in size: they were frequently square, and in thickness rarely exceeded an inch and three quarters: the clay was evidently well tempered, and the bricks thoroughly burnt, the surfaces being in many cases scored deeply in order to form a key for the mortar. The Romans carried the art of brickmaking to very great perfection, and used this material for nearly all their principal buildings, employing it as a backing to their walls even where more costly materials were used for facing. They introduced brickmaking into the various countries which they conquered where suitable earth was found, among others into England, and frequent remains of Roman brickwork still exist: in fact so good were their bricks, that in numerous instances they have been re-used in later work. St. Alban's Abbey, which was built in the latter part of the eleventh century, is a good example, a very large number of bricks used in its construction having been taken from the ruins of the old Roman city of Verulam. The art of making bricks in England seems to have languished if not to have died out altogether from the time of the departure of the Romans until towards the end of the thirteenth century; the oldest existing example of brickwork being Little Wenham Hall in Suffolk, which was built about 1260. In the time of Henry VIII. brickmaking had considerably developed, and very elaborate mouldings were executed which were probably copied from some of the specimens of brick architecture which are to be met with in many parts of the low countries. The seventeenth and eighteenth centuries afford many excellent examples of moulded brickwork, and the number of bricks made in this country kept on increasing until the manufacture received a temporary check at the end of the last century by the imposition of a tax, which varied at times from 2*s.* 6*d.* to 5*s.* 10*d.* per thousand until it was entirely repealed in 1850. Since that date the manufacture has developed very largely in consequence of the great increase in building operations, and the number now made annually in this country cannot fall far short of ten thousand millions.

The subject of bricks and brick-making is a very wide one, and it would be obviously impossible to treat it fully in a short article. The number of different kinds of bricks is so large, the processes of manufacture vary so widely in different parts of the country, and the scientific principles underlying these processes—involving, as they do, a wide knowledge of physical science—are so complicated and so little understood that several volumes might easily be written on the subject. I shall merely attempt to describe briefly what are the qualities of a good brick, and upon what these qualities depend, and to point out the sanitary evils which result from the use of such bricks as are too frequently employed in the erection of those suburban villa residences which are the mushroom growths of the happy hunting-grounds of the speculating builder.

A brick is not an ultimate fact of nature, but its qualities as a building material depend upon the constituents of the earth from which it is made and the manner in which this earth is prepared, dried, and burnt. It is frequently imagined that a brick is simply a rectangular piece of burnt clay; but the varieties of clays are very numerous, and, as a matter of fact, it is extremely rare to find natural earths suitable for brick-making: nearly all require the admixture of sand, loam, chalk, or other substances.

Brick-earths may be divided into three classes, clays, marls, and loams. These all contain silica and alumina, and generally a trace of oxide of iron.

Among the natural earths suitable for bricks is that mild alluvial clay or marl which used to be found near London combined with a calcareous substance called 'race.' This clay produced the fine yellow malms which give a special character to London brickwork of the early part of the century.

The marls have a considerable portion of lime mixed with them, and the loams are light, sandy clays with an excess of silica: firebrick clays are almost entirely free from lime, magnesia, &c. All these constituents are chemically combined, and it is a curious fact that it has hitherto been found im-

possible to mix artificially the component parts in the same proportions in which they exist naturally, and to obtain that quality of plasticity which is in the natural substance.

Pure clays are nearly always too strong for brick-making, and require to be mixed with milder earth, and the loams are so sandy that the admixture of lime is required in order to bind together the siliceous particles.

As the natural marls became exhausted, some one—it is not known who—discovered the possibility of making an artificial marl or malm by mixing chalk and clay together, after thoroughly washing them and reducing them to pulp, much in the same way as in the preliminary process of making Portland cement; and this process is now very largely adopted for the best bricks in the neighbourhood of London. The general routine of brickmaking is as follows:—The ordinary brick-earth is dug in the autumn, and turned over so that it may be broken up by the frosts of winter. It is then laid on a hard floor, and 'malmed' in the spring; that is, the liquid artificial malm, made as above stated, is conducted on to the earth and covers it completely. The proportion of malm to brick-earth depends entirely upon the nature of the earth. The whole mass is left to settle for some weeks, and it is then 'soiled'—that is, covered with fine sifted ashes; and this operation is a very important one, as upon the proportion of ashes to the whole bulk of earth the quality of the brick when burnt will mainly depend. No general rule can, however, be laid down, as very much depends upon the nature of the material itself, also upon its state of humidity and upon the meteorological conditions of the atmosphere at the time of mixing. A very large amount of actual experience is required, and it frequently happens that the individual who has this experience is unable to impart it to others.* After soiling, the heap is again left undisturbed till the moulding season commences, when it is tempered—that is, turned over with a spade and watered to bring it to a proper consistency, after which it is thrown into the pug mill and thoroughly kneaded together when it is ready for moulding, in which process a small quantity of sand is mixed with it, and it is formed by hand into the size and shape of an ordinary brick. Now all these processes, which have been briefly described, have to be conducted with great care. The clay is hardly ever found without pebbles, and if means are not adopted for screening them off or crushing them they will become imbedded in the brick, and will cause it to crack during burning; if the chalk is not thoroughly ground up, unslacked nodules will find their way into the bricks and will eventually slack and blow the brick to pieces; if the tempering in the pug mill is not well done the brick will not be homogeneous; and if the moulder does not press the clay well and uniformly into the mould it will when burnt lack density, and probably be very porous. Equal care has to be given to the next process, which is that of drying the bricks in hacks before burning, and it is this stage that probably is most neglected. A considerable proportion of the contained water must be evaporated before it is safe to burn the brick, and if this is not done it turns out quite rotten, and falls to pieces at a single blow. This kind of brick is called a shuff, and if it is attempted to use such in a building damage is sure to result. During the drying process the bricks have to be protected from frost and wet. The next operation is burning, and London bricks such as have just been described, in which the breeze is mixed with the earth, are always burnt in a clamp. A clamp is an erection formed mainly of the raw bricks to be burnt, cased in and partially supported by burnt bricks. The raw bricks are placed in layers slightly inclined towards an upright wall in the centre of the clamp, and between each layer of bricks is one of breeze or cinders, the latter being thicker at the bottom of the clamp than at the top. Open flues are left at intervals which are filled with faggots for the purpose of firing the clamp, and after these have been ignited and the breeze is well alight the openings of the flues are stopped up with clay, and the whole mass burns until the breeze is all consumed. The courses of brick are laid on the incline, and not horizontally, in order that as the breeze burns away there may be no tendency for the bricks to fall outwards. It is manifest that in this method of burning it is quite impossible that all the bricks should be equally burnt, those near the outside being underburnt, and those close to the flues, where the draught is greatest, being frequently completely fused. The former are called place bricks, and should never be used for outside work, or in situations where they are subject to great pressure, which they are not calculated to resist: the fused bricks are called burrs or clinkers, and are extremely hard; they may safely be used for foundations, if not too irregular in shape, but are of course not suitable for facings. Between the two extremes of place bricks and clinkers there are many gradations in the bricks from the same clamp, and they are sorted out and sold as malms, seconds, &c. It is frequently imagined that the variations in the quality of bricks when burnt are owing to differences in the making, but in nine cases out of ten these are due solely to the burning.

In the provinces generally the processes of digging and turning over the brick earth are carried on much in the same way as in the London brick-fields, but in many cases the earth is very hard, and contains lumps of limestone, and here the process of grinding and crushing the earth is resorted to. This is an excellent practice so long as ordinary care is used in the selection of the earth, but just as is found to be the case when a mortar mill is used for grinding and mixing mortar, there is a strong temptation to use almost any earth, whether suitable or not, and the consequence is that bricks are frequently turned out that are quite worthless. For the best class of bricks the earth is passed through the washing mill, but for ordinary kinds the tempering is done by treading and by the spade, as in the London district, but no breeze or fuel is mixed with the earth, and this constitutes the principal difference between the stock brick and other kinds. The tempered earth is moulded and dried in the usual way, and the bricks are then burnt, or rather baked, in a kiln or oven, which is in some districts rectangular in shape and in others circular, with a domed top. Arched fire-holes are formed opposite each other and connected by flues formed of the bricks which are to be baked: the number of the fire openings depends upon the size of the kiln, which varies considerably. The arrangement of the bricks in the kiln is a work of some skill, as care must be taken that the heat

* A similar peculiarity has been noticed in the case of men who are accustomed to mix colours for dying purposes, the proper proportion of the various tints being very important; and often the best mixers use no measures at all, but are able to tell by a species of instinct the amount that is required to bring about the desired result.

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should be able to pass all round each brick, and that there should be a proper draught throughout. Coal is used for fuel, and fires are made up in the various fire-holes, and the heat applied very gradually, in order that the steam may be driven off before the actual baking commences. When the full heat is attained the top and all openings are carefully covered over with clay or turf to avoid unequal draughts, and a steady heat is kept up for a time, which varies according to the nature of the brick-earth and the kind of brick which is to be burnt, after which time the fires are extinguished and the kiln is allowed to cool. The same thing happens with kiln-burnt bricks as with those burnt in a clamp, viz., that different qualities are taken from the same kiln, the bricks that are close to the fire always becoming partially vitrified and nearly black, and those which are under-burnt being usually of a mottled colour.

The exact tint which properly baked bricks assume depends in the first instance upon the nature of the clay, which, if pure, and combined with silica only, would always burn of a pure white, but as nearly all clays have in their composition a varying quantity of metallic oxides, these give all the gradations of colour which are met with in bricks. If oxide of iron is present in very small quantities, the resulting tint will be a light tawny yellow so long as the heat of the kiln is not too great. If there be a small proportion of silica and a large quantity of oxide of iron, the favourite red colour is produced. The presence of lime changes the red colour due to iron to a creamy brown. Where oxide of iron is combined with a small quantity of oxide of manganese a black tint results; and clays naturally burning red will turn yellow by the admixture of a fusible white sand. In all cases, however, the final tint of the bricks depends to a very large extent upon the conditions of burning. For instance, in the case of many of the Staffordshire clays, an extra two hours' firing converts red bricks into blue ones, and it is upon an accurate knowledge of these conditions gained by practical experience that the production of any desired tint depends, and its uniformity is secured. The great faults of ordinary kilns are that the fuel is used uneconomically, and that a considerable amount of heat is wasted during the cooling of the baked bricks. These faults have been remedied by the invention of the Hoffman kiln, which is arranged in compartments, so that all stages of burning, from the filling in of new unburnt bricks to taking out the finished ones, can be proceeded with simultaneously. Besides this, the air supporting the combustion of the fuel is gradually warmed by passing over chambers containing the bricks which are cooling until, on its arrival at the burning chamber, it has almost the temperature of the furnace itself, and from this point it is again taken through another series of chambers and utilised for drying the new bricks before passing up the chimney shaft. An arrangement of dampers allows any chamber to be shut off at pleasure, so that practically there is no necessity for allowing the fires to go out at all, and the cost and delay of rekindling are avoided.

Of late years, in places where a large number of bricks are made annually, machinery has almost entirely superseded hand labour in brick-making. Brick machines may be briefly described as of two kinds; first, those which act upon the moist clay after tempering. These consist of a pug mill for tempering the clay, and a means of moulding it into the proper shape. They either force out, through a suitable mouthpiece, a continuous column of pressed clay of the proper width and thickness, which is cut by wires into the required brick sizes as it is pressed out from the machine; or press the clay into a mould of the exact size of the brick which is then discharged from the mould on to a table. The former class of machine is a very useful adjunct to a brickfield, where the clay is free from stones, and uniform, but where this is not the case, and also for stock bricks, it would be quite useless, as the cutting wires would drag out the particles of stone or breeze, and the face of the brick would not be even. The pressed bricks made by a machine, as a rule, have extremely sharp arrises and even faces, but it frequently happens that some time after being used in a wall the outer face flakes or chips off. This is probably due to the fact that the extra pressure of the machine is not transmitted entirely through the moist brick, which is thus not quite homogeneous, the outer surface being denser than the interior, consequently there is great risk of the interior not being sufficiently dried before the brick is taken to the kiln, and if this is the case the brick is certain not to last.

The second class of machines operate upon clay which is nearly dry, and in these much greater pressure is used than in those which act on the moist clay; in fact some of them are capable of exerting a pressure of between 300 and 400 tons. The clay, before being placed in these dry machines, must be very finely pulverised, and they must therefore be used in combination with a powerful set of crushers for producing this result. In one such machine the clay, after being crushed, escapes into a receiver, from which a band, with small buckets attached, carries it to the hopper of the moulding machine, where it is powerfully compressed by the moulds and turned out in the proper shape. These dry clay machines produce a denser brick than the others, and, moreover, there is a considerable saving of time through their not requiring drying before being burnt. There is, however, great danger that the air which collects between the small particles of the crushed material will not be thoroughly driven out, and in this case the brick would be seriously injured by the expansion of the air during burning. One machine has been constructed so as to give several distinct squeezes at intervals, with a view of obviating the difficulty.

Various patterns of moulded bricks of a red or white colour are now made by different manufacturers, among whom may be mentioned Rosher & Co., the Hartshill Brick & Tile Co., the Bracknell Pottery Co., and Messrs. Brown, of Braintree. The latter firm have some extremely artistic patterns which they keep in stock, and their bricks are, as a rule, of excellent quality, the figures being very sharply cut. Figs. 1 to 4, p. 6, show some of their moulded bricks, which afford a very cheap means of obtaining architectural effect in the elevations of brick buildings. For obtaining the same effect with more originality of design, some excellent red rubbers and cutters are made by Mr. Lawrence, of Bracknell, and these can be worked by hand into any desired pattern.

Bricks with an enamelled face in various tints have recently been manufactured, and at the recent Building Exhibition some good specimens were shown by the Bourtree Hill Colliery Company. This enamelled face is given by applying to the surface easily fusible

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salts, such as the silicates and borates of sodium, &c., to which metallic oxides are added if colour is required, and if the bricks be burnt at a sufficiently nigh temperature, the enamel becomes thoroughly incorporated with the clay, which for this purpose must be a species of fire-clay.

FIG. 1.

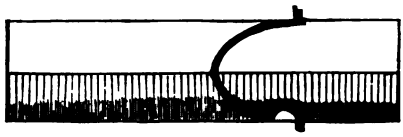

FIG. 2.

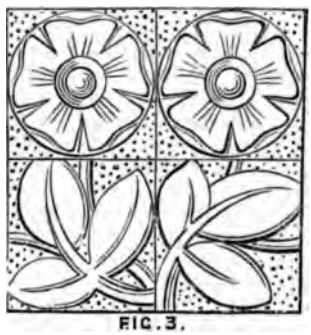

FIG. 3.

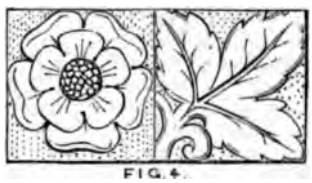

FIG. 4.

The characteristics of a good brick are—1, that it should be regular in shape, in order that the pressure upon it should be equal over all its surface; 2, that it should be tough and not brittle, so that when a building is being erected, there may not be a very large proportion of bats and half bricks caused by the labourers shooting down the bricks from their hods; 3, that it should have a clear metallic ring when gently knocked against another brick; 4, that when broken it should show homogeneity of structure; and, 5, that it should absorb little water. This is the most important characteristic of all, and one that could be very easily tested, though it is often quite neglected. If a brick absorbs much water, the walls of houses built with it will, during many months of the year in damp climates, never be dry at all, and the warmth of the interior will certainly have a tendency to draw the moisture into the house, the consequence being that wall papers will be soiled, and the rooms rendered damp and unhealthy. Moreover, in winter, frost will find its way into the interior by the bricks, and will tend to break them up. No bricks can be obtained for ordinary house-building that do not absorb some water, but the amount should never exceed from 10 to 15 per cent. of the volume of the brick, and those bricks should be preferred which absorb slowly, for as a rule it is found that the rate of absorption of water is in inverse ratio to that of parting with it, so that a quickly absorbing brick will lose its water very slowly; it is needless to dilate on the disadvantages of such a characteristic.

About fifteen years ago the Manchester Society of Architects issued a report upon brick-making which contained some valuable recommendations to brick manufacturers, one of the most important being that moulds should be adopted in different brickfields which would ensure the bricks when burnt being of one uniform size. This is supposed to be the case now, but as different earths contract differently, it frequently happens that the bricks from different fields differ both in thickness and width, and great difficulty is thus occasioned in making the courses regular, where one kind of brick is used for facing and another for backing. It would be too much to he hoped that the present size of bricks will be generally altered, but for many reasons a longer and thinner brick would be preferable, and for very good work an architect will occasionally have bricks specially moulded; but of course this is impossible for ordinary buildings.

The whole subject of bricks and brick-making has not received the attention it deserves, probably because the opinion was long held that stone must be used for any important building. For London, however, or any other smoky city, brick is a far preferable material, and now that such eminent architects as the late Mr. Street and Mr. Waterhouse have shown with what artistic effect brick can be employed, we may hope that the subject will be neglected no longer.

Although, strictly speaking, the quality of the mortar in which bricks are laid has no necessary connection with the bricks themselves, yet as bricks are never used except when built into walls, and as the quality of brickwork depends very largely upon the kind of mortar used, a few works on this material may appropriately close this article. All that was stated in the description of concrete as to the necessity of using a good cementitious material, such as ground stone lime or Portland cement, in preference to chalk lime, applies equally to mortar. In districts where chalk lime is plentiful and used for mortar, buildings are never found to stand well when exposed to the weather, as the rain gradually washes out the mortar from the joints. It is also essential that the sand used should be clean and sharp and free from loam or earthy matter. If the sand found in the locality is not very sharp, the mortar would be greatly improved by mixing with it a certain proportion of pulverised coke or smith's ashes. If black mortar is required, the latter should be used as the colouring matter; but builders find it much cheaper to use lampblack, which always deteriorates the mortar. The exact quantities which should be used of the various ingredients depend somewhat upon their quality, but as a general rule three of sand and one of lime makes very good mortar. It is very essential that all the ingredients should be thoroughly mixed up and incorporated together; and the lime should be well ground, as otherwise small unslaked nodules will find their way into the mortar, and will 'blow'—that is, swell in slaking—and damage the mortar after it has set. A mill is now frequently used for mixing mortar; and there is no doubt that very good mortar can be thus made with materials that could not be used if only

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mixed by hand, in consequence of their more complete amalgamation. But with some speculating builders the mill appears to take the place of all other ingredients except rubbish, often of the vilest quality, no sand being used at all, and the lime being supplied only by the old mortar adhering to old broken bricks. It need not be stated that such mortar is quite useless, and never becomes hard. Really good mortar, after being thoroughly set, should be so hard as to receive no impression when scratched with the finger-nail, but some considerable time must elapse before this result is attained; and if a building has to be erected with great rapidity, it is much the safer plan to use cement. Exactly the same precautions have to be taken in making mortar as in making concrete, the only difference between the two materials being that large stones are used for the latter, and sand only for the former.

COMMON DEFECTS IN THE SANITARY ARRANGEMENTS OF HOUSES, WITH THEIR REMEDIES.*

By Prof. W. H. Corfield, M.A., M.D. (Oxon.)
Professor of Hygiene and Public Health, Univ. Coll., London.

The best plan in the examination of a house is to begin at the top of it, and so we will begin examining a house from the roof, proceeding downwards, and in our way I will point out the different mistakes that are likely to be made in the sanitary arrangements in various parts of the house.

The first thing which we must consider is that we have to get rid of the water that falls on the roof. The water from the gutter in front of the house may be disposed of in one of several ways. It may be conducted by a pipe outside of the house down the front into the area; or it may be conducted by a gutter through the roof, or, perhaps, through one of the rooms in the upper storey into a gutter, over the middle of the house, between two parts of the roof, and down the middle of the house by a pipe into the drain; or it may be conducted direct from the gutter by a pipe, not outside the house, but inside the house, passing down through one or two storeys, inside the rooms, perhaps through the best bedroom in front of the house, through the drawing-room, carefully hidden by some casing made to look like an ornament, through the dining-room and kitchen into the drain in the basement. Smells having been perceived in different parts of the rooms, especially in the bedrooms, various sanitary arrangements may be improved, and even made as perfect as they can be, by a kind of amateur tinkering prevalent nowadays in sanitary matters; and yet this defect, which is so exceedingly serious, which is known to give rise to serious disease, is entirely overlooked—perhaps for years. The same is the case when the rain water is carried in a gutter through the roof into a gutter between the two roofs in the middle of the house, and down by a rain-water pipe inside the house. In such cases similar disasters may occur.

But there is an additional danger from the fact that these inside gutters are in themselves most pernicious things. Soot and rotten leaves collect in them, and air blows through them into the house; and especially when these gutters are under the floors of bedrooms, this foul air is often the cause of illnesses which occur in these rooms. Even gutters which are not themselves directly connected with the drains, and which are open at both ends, but in which decayed leaves and soot accumulate and give off foul air into the rooms, may be the cause of sore throats. I have known this to be the case in rain-water gutters, which have been carried inside the house so that they might not form an unsightly feature outside, and which have passed through bedrooms under the windows in a kind of position in which a sink would be. These gutters have been open at both ends, and only ten or twelve feet long; and yet in such a case I have known illness to occur in these very rooms, which I should never have suspected to be due to these gutters if I had not known in previous cases that illness had arisen from the passage of rain-water gutters through rooms.

Another plan to dispose of the rain water is to carry it in a gutter right through the house to the back (the gutter may pass through the roof or the garrets), and the same remark applies to this method of construction as to those I have described, except that it does not imply necessarily a defective pipe running down to the drain.

Well, then, the rain water from the roof should be conducted by pipes placed outside the house; and there is no reason why this should not be always the case. If these pipes are not disconnected from the drains below, but are connected with them either directly, or even indirectly, if I may so call it (with a bend in the pipe to hold water), in either instance cases of disease will arise in the rooms, the windows of which are near the rain-water pipes.

It is exceedingly difficult to persuade people upon this point; but such is the case. You will understand that when the rain-water pipes starting from the top of the house below the bedroom windows, and frequently behind parapets, so that any air that comes out at the top comes out exactly close to the bedroom windows, you will understand that when this is the case, and when these pipes come down straight into the drains and so ventilate the drains, foul air from the drains gets into the house, and disease is the result. But it is more difficult to make people understand that even when these rain-water pipes are trapped at the foot they are almost as dangerous as the untrapped ones, because foul air from the drains will pass gradually through the water in the traps into the pipes, so that these pipes are always filled with foul air and contain gases that have come from the drains.

As soon as it rains, water passes down, and the air of these pipes is displaced, comes out at the top, and so if these tops are near the windows of rooms, cases of disease will happen in those rooms.

So much, then, as to the disposal of the rain water from the roof. While on the roof we can look around and observe the ventilating pipes: 1st, whether there are any or not; 2nd, of what size; 3rd, whether they have cowls or not; and 4th, in what positions they are. If we observe that they end at the top, near to chimneys, we shall see that there is liability, on account of the down draught, of the foul air from these ventilating pipes passing down the chimneys.

Chimneys often have down draughts, and if ventilating pipes are placed near them, the foul air may pass down into the rooms. If, on the other hand, although

* A lecture delivered at the Parkes Museum, June 14, 1883.

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not ending near the tops of the chimneys, they are placed close to the chimneys or to walls so that their tops are sheltered, they will not act properly, and they ought to *be carried above the ridge* of the roof, and end away from walls or chimneys. The same rule applies to chimney tops, they should not be sheltered by higher buildings.

We will now pass from the roof into the house, and the first thing we shall come to of course, inside or just below the roof (or perhaps on the roof), is the

CISTERN.

The first thing we observe is the material of which it is made. I will say nothing more now about that, except that lead cisterns (and so, too, galvanised iron cisterns) are affected by certain kinds of water; and it is important, in certain places, that cisterns should be used which are not capable of being affected by the water. Galvanised iron cisterns cause certain forms of poisoning with some waters. However, as a matter of fact, both lead and galvanised iron cisterns are used enormously, without any serious results following from their use.

A cistern is provided with an overflow and waste-pipe. If the cistern is on the roof you would think it the natural thing that the overflow-pipe should discharge on to the roof or leads, or into an open head; but, as a matter of fact, it is generally not the case. (By an 'overflow'-pipe I mean a pipe from the top, and by a 'waste'-pipe a pipe starting above the level of the water and passing through the bottom of the cistern.)

Overflow-pipes were not in fashion at all until recently. The fashion was to have a waste-pipe, and the most convenient place to take that into was some pipe passing down the house, which might be a rain-water pipe, but more frequently it was the pipe into which the water-closets discharged, which is called the 'soil'-pipe.

When this is the case the waste-pipe of the drinking water cistern becomes the ventilator of the pipe into which the water-closets discharge; and so in nine cases out of ten the ventilator of the house-drain and of the sewer under the street, and, indeed, one of the ventilators of the main sewers of London. So foul air passes continually by means of this ventilator into the drinking water cistern at the top of the house. Now foul air in sewers and drains contains matters in suspension, and often the poisons of certain diseases, such as typhoid fever; it gains access to the water in the cistern and contaminates it. I do not hesitate to say—I have on another occasion produced figures to prove it—that the main cause of typhoid fever in London and many other large towns is the connection of the drinking water cisterns with the drains by means of the waste-pipes.

Of course the remedy for this—the first remedy—was to put a trap on the waste-pipe, as, for instance, connecting it with the trap in one of the closets or sinks. This, of course, is only a palliative, it is not the true remedy. The true remedy is to disconnect this pipe and make it discharge by itself, no matter where, in the open air. Sometimes I should say this pipe is made to discharge into the same pipe that the sink waste-pipe discharges into. It is the practice in London to have a separate pipe for the various wastes and sinks not discharging directly into the drain, and usually carried outside the house. It is also the practice to make the waste-pipes of cisterns to discharge into the same pipe. This is entirely wrong. Because, although disconnected at the foot, it is to be regarded as a foul-water pipe, and foul air passes through it up the waste-pipe into the cistern. So this practice is to be condemned.

Now from the cistern, besides the waste-pipe, there are pipes which supply the water to different parts of the house; there are pipes from the cistern to supply water to the taps, which are called 'draw-off' pipes; and pipes from the cistern to supply water to the closets; and, as a rule, the same cistern is used for the supply of water to the closets direct and the taps at the upper part of the house. This plan may or may not be very dangerous.

There are two ways of supplying the water-closets in the upper part of the house with water. The one is to have what is called a spindle-valve in the cistern, which fits a hole in the bottom of the cistern, and which is raised by a ball-lever being pulled by a wire, which arrangement necessitates a contrivance called a valve-box, which has a small air-pipe, and with this arrangement there is liability for foul water to be jerked in the cistern. Moreover, the pipe from this valve-box passes into the pan of the water-closet and becomes full of air, which air is liable to get into the valve-box in the cistern. This arrangement, therefore, is decidedly bad. But there is another, in which the valve which supplies the water-closets is under the seat, and the pipe from the cistern is full of water; and that is now becoming the more usual plan. With that plan there is nothing like so much danger as with the other method; in fact, so little, that many people hesitate to condemn this arrangement.

However, to put it on no other grounds, it is clearly desirable not to have cisterns supplying drinking water and the water-closets direct. It is better to lay down a right principle, and abide by it, than to see how you can avoid it. The best rule is that water-closets should not, for the reasons I have stated, under any circumstances be supplied direct from the cistern supplying the taps. I say supplying the taps, because I am told continually that this tap or that tap does not supply drinking water. I lay down the rule that *every tap is a drinking-water tap, because anyone may draw water at it.*

We come next to the sink.

HOUSEMAID'S SINK.

The housemaid's sink is often placed in a small closet just under the stairs, without any window or any sort of ventilation whatever (and we know what kind of things are kept in the sink!), so that the housemaid's sink in such a position has not by any means a very savoury odour. The housemaid's sink should under no circumstances be in such a position. It should be against an outside wall, and have a window. As a rule, the material used for the sink itself is lead, wood lined with lead. Now lead is not a good material. Grease, soap, and so on, have a tendency to adhere to lead, and it is very difficult to keep such sinks clean, and it would be better to have the sink of glazed stoneware.

The waste-pipe of the housemaid's sink, as a rule, is connected directly with the trap of the nearest w.c. There is a grating in the sink, and there is no trap in or under the sink, but the waste-pipe is connected with the trap of the nearest water-closet. This is a bad arrangement. A worse arrangement is for the waste-pipe to be connected with the soil-pipe of the water-closet, in which case some kind of trap is generally placed on the waste-pipe of the

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sink. This trap is frequently what is called a 'bell' trap, and is placed in the sink. The disadvantage of the bell trap is, that when you take the top of it off you take the bell with it. The bell is the arrangement which is supposed to form the trap by the edges of it dipping in the water in the iron box; and you see at once, when the bell is removed, the trap is removed and the waste-pipe, wherever it goes, is left wide open, and, if connected with the soil-pipe of the water-closet, the foul air comes up into the house. Very frequently also the waste-pipe of the sink has underneath it what is called a D-trap. A D-trap is a trap which the water passing through it can never clean; so it retains foul water; and therefore, even under sinks, such traps ought not to be allowed on account of the foul matters which accumulate in them.

The waste-pipe of the housemaid's sink should not be connected with the water-closet or soil-pipe; neither with any pipe that goes directly into the drain. Its own pipe should not go directly to the drain, which is very frequently the case, but through the wall of the house into an open head or a gulley outside. Very frequently the housemaid's sink is supplied with water, not from the cistern on the roof, but from the cistern not only supplying the nearest water-closet, *but actually inside the nearest water-closet*, in which case, no matter what valves you have, you are supplying your sink with water which is kept in a cistern inside the water-closet, and that is far worse than supplying a sink with water from a cistern which also supplies the water-closet, with a reasonably protecting valve.

Close to the housemaid's sink, and very frequently over it, is the feed cistern to the hot water apparatus, which has also an overflow pipe, and the same remarks refer to this overflow pipe, except that it is a thing much more liable to be overlooked, as to the overflow pipe of the drinking-water cistern.

We come next to the

WATER-CLOSET.

In the great majority of instances the apparatus of this closet is what is known as the *pan* closet; that is, a closet apparatus which has a conical basin with a tinned copper bowl, called the 'pan,' from which the closet gets its name. In order that this 'pan,' which holds water, may be moved, there is a contrivance underneath called a *container*, which is generally made of iron, and allows room for the pan to be moved. On pulling the handle the water is discharged into the pipe below. The container being generally made of iron it is liable to rust. Now the disadvantage of this apparatus consists in this large iron box, which is under the seat of the closet, being generally full of foul air. The contents of the pan are splashed into it, and it becomes coated with foul matters which decompose and continually give off foul air. Every time the handle of the closet is pulled some foul air is forced up into the house. That foul air is kept in this box between the trap which is below it and the pan which contains the water above it. In order to allow of the escape of this foul air it is not uncommon to have a hole bored in the top of the container. You would suppose that hole was intended to fix a ventilating pipe to, but nothing of the kind; the hole has been made merely to allow the escape of foul air into the house. Over and over again I have met with cases of disease distinctly traceable to the escape of foul air from these holes. Sometimes a ventilating-pipe is attached to this hole and taken out through the wall, but that is the exception. This form of closet is the worst form of closet apparatus yet devised, and is very generally in use.

An attempt has been made to improve it by having a stoneware container, with a place for ventilation at the side, only it is an attempt to improve a radically bad arrangement, and not worth further consideration. Underneath this closet apparatus you will, as a rule, find, if you take the woodwork down, a tray of lead, called the '*safe*' tray. But there is no other word in the language that would not be a better description of it than this word! This tray is intended to catch any water that may escape from leaky pipes, or any slops that may be thrown over; and so it is necessary that this tray should have a waste-pipe. The waste-pipe in nine out of ten cases, probably in much greater proportion, goes into the trap immediately underneath the closet, and so it forms a communication for foul air from this trap to get into the house.

In some instances it goes directly into the soil-pipe, and forms a means of ventilation of the soil-pipe into the house. Sometimes a trap is put on this waste-pipe, and it is then connected with the soil-pipe, which goes on well so long as there is any water in the trap; but as soon as the water becomes evaporated, foul air gets into the house again.

Sometimes (to show the ingenuity which people often expend upon bad things) this waste-pipe has a trap, and a little pipe from the water supply fixed to feed the trap; but all these ingenious plans have been devised in order to improve upon a principle radically wrong. The pipe should be carried through the wall and end outside the house as a warning pipe.

Scarcely any water ever comes out at all; if any does come out, it shows there is something wrong, so that this pipe should pass through the wall, and be made to discharge outside the house.

In order to prevent wind blowing up the pipe it is usual to put a small brass flapper on the end. Its weight keeps it shut, and the pressure of water opens it.

Underneath the safe-tray you will find as a rule a trap of some kind, and generally the trap that is found is a D-trap, a trap whose name indicates its shape, and which cannot be washed out by the water that passes through it. The pipe from the closet passes so far in it that it dips below the level of the out-going pipe, and thus forms a sort of dip-trap. The pipe which is the inlet from the closet is not placed close to the edge, but a little way in. Why I do not know, except to form a receptacle for all kinds of filth!

You will see it is impossible for the water that passes through it to clear the contents out, so that the trap is simply a small cesspool, nothing more nor less. Into that trap various waste-pipes I have mentioned already are frequently connected.

There is another form of D-trap in which there are two waste-pipes going into the water near the bottom of the trap (probably the waste-pipe of the safe and the waste-pipe of the cistern).

The D-trap, then, is a bad form of trap, because it is not self-cleansing. The water cannot possibly keep it clear of sediment. So that some trap should be used which is self-cleansing, and the water which passes through which is capable of keeping it clean. Now that trap is a mere Ω-shaped bend in the pipe,

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to which we give the name of siphon, not because we want it to act as a siphon—for if it acts as a siphon it is of no use!

Now I have a curious thing to say about siphon-traps and pan-closets, and that is, that the form of trap which was used first in connection with water-closets was the siphon-trap, which we now praise; and the form of trap which supplanted it was the D-trap, which we are now condemning and taking out wherever we can. A still more curious thing is that the form of water-closet which we now condemn (the pan-closet) was the form of closet which supplanted the closet we are now using (the valve-closet). The valve-closet was invented long before the pan-closet. Bramah-valve closets fixed forty years ago often act tolerably well now, and at the present day they are only taken out because they are really actually worn out.

The valve-closet, which we often find upstairs in old houses instead of the pan-closet, has no large iron container under the seat, but it has a water-tight valve under the basin, and so requires a small valve-box; so that there is no great collection of foul air immediately under the basin of the closet. The valve-closet, however, has a disadvantage in that it requires an overflow-pipe; because the valve is water-tight, and if servants throw slops into it, or the supply-pipe to it leaks, the water goes on running and the basin fills, and, if there were no overflow-pipe, it would overflow on to the floor; so that I believe that the pan-closet ousted the valve-closet because it was found that people could go on throwing in any amount of slops and using it in the roughest manner without getting their ceilings damaged. However, the valve-closets, as they were originally made, generally had overflow-pipes which went into part of the apparatus below. Occasionally I have found these overflow-pipes connected with soil-pipes or the trap of the closet below, but these were exceptional instances.

But it is a curious fact that the valve-closet, which was first invented and afterwards discarded, we now consider the best form; and the siphon-traps which we now use were invented first and then supplanted by D-traps, which are now being got rid of as fast as we can.

The contents of the water-closet are discharged, as a rule, into a separate pipe, called the soil-pipe; but sometimes into a rain-water pipe with an open head near the windows, or even *inside* the house. The soil-pipe is usually inside the house—probably because it ought to be outside! Even where water-closets are against an external wall, the pipe is often carried down inside the house; which leads me to say that closets themselves, like sinks, ought not to be placed in the middle of the house. They are very frequently under the stairs, close to bedrooms, or in the middle of the house, sometimes ventilating into a shaft. It is of course inevitable in these cases that the pipe must either be carried inside throughout the whole length of the house, or must run nearly horizontally under the floors of bedrooms, &c. Under such circumstances it is often not properly ventilated; and if not ventilated at all, the foul air makes its way out through holes, which it is capable of perforating in lead pipes. I could show samples of lead pipes perfectly riddled with foul air that had collected in the pipe. We have a sample of such a pipe in this Museum: a long piece of lead soil pipe, taken up from under the floor of a bedroom (laid nearly level), perfectly riddled with holes. It was only found out on account of the great nuisance which existed.

The soil-pipes are then frequently inside the house, and they are as a rule made of lead. They are very frequently not ventilated at the top, and the pieces are jointed together by merely being slipped into one another, with perhaps a little putty or red lead. Of course these joints are not sound joints. The soil-pipe goes down into the drain, and so the foul air gets into the house. The soil-pipe, whether inside or outside the house, ought to have sound joints. If a lead pipe, soldered joints; if an iron pipe, the joints ought to be made secure in a proper way, preferably by pouring Spence's metal into the sockets.

If any part of the soil-pipe must pass inside the house it should be of lead, and it can be made sound so long as it will last (and is not damaged by driving nails into it).

I remember an instance in which the soil-pipe passed down through the larder, and was concealed in the wall of the larder by plaster, so that no one ever saw it, and the people in the house could not account for the foul smell in the larder. While searching for the pipe I took hold of a nail on which some dish-cloths hung, and on pulling it out found that it had been driven into the soil-pipe and had a mass of filth sticking to the end of it. So you see the damage which may be caused in this way. Iron pipes should not be allowed to be inside the house. It is so very likely that the joints will not be made perfectly tight, so that it is more undesirable to have iron pipes inside the house than it is to have lead pipes.

Of course it is practicable to plug the pipe at the bottom and to fill it with water to ascertain if it is water-tight; but all that is only a device to retain a thing which ought to be altered.

Soil-pipes ought always to be ventilated by a pipe as large as the soil-pipe carried up above the roof.

If closets are in the middle of the house they ought to be done away with, and should be put against an outside wall. This might be done by sacrificing a bit of some room which can be spared, or by converting some small bedroom into a bath-room and closet, or still better, by making a sort of tower outside the house.

I said that D-traps were made of lead; well, all D-traps that I have known have been made of lead except one—which is in this Museum—which is unique. This is a specimen of a D-trap taken from underneath a closet of a large country house. It is made of *zinc*! It is a very large boat-shaped trap. It has a zinc tray over it, and its waste-pipe is also made of zinc. The waste-pipe of the housemaid's sink close by, which was also made of zinc, and the waste-pipe of the cistern, which was of lead, both discharged into the zinc D-trap.

The top of this trap has got large holes in it made by the foul air. I have told you that soil-pipes are generally made of iron or lead, but in this instance you see it was made of zinc. This zinc soil-pipe passed along under a passage in the house into an iron pipe built into the wall, which fitted into a 4-inch stoneware drain, which went along into the park into an unventilated cesspool, so that the air from the cesspool escaped into the D-trap and into the water-closet, which was not against the outside wall, and had no window.

The people of the house were very much astonished

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that there was always an abominable smell in this closet; but it was not until two epidemics of sore throat that they were roused to action to have the matter seen to. You will be surprised that they had not any typhoid fever. The only reason was that this fever was never taken into the house. Typhoid fever has a specific poison which has to be taken into a house before the fever can appear there. You may have a house or a town in the worst possible sanitary condition for any number of years and have no typhoid fever unless the poison of the disease is taken there. So much for the water-closets. We come next to the

BATH-ROOM.

The first thing I have to mention in connection with the bath-room is that the inlet and outlet openings for the water should not be the same. Very frequently in a bath the water goes out by the same apertures as it comes in. This is a bad plan, for some of the dirty water comes back with the clean. The waste-pipe should be treated in the same way as the waste-pipe of a sink.

Now I need not say anything more about upstairs water-closets in the upper parts of the house; the same remarks that I have made will apply to them, except that it very frequently happens that the closet on the ground-floor has a separate soil-pipe which is not ventilated. Frequently on the best bedroom-floor there is a water-closet actually in one of the bedrooms, or opening directly out of it by a door. This ought not to be countenanced under any circumstances whatever.

On the drawing-room floor there is generally a balcony, the pipes from which go very frequently straight down to the drain, or they are connected with rain-water pipes from the top of the house, which *themselves* discharge into the drain; so that these pipes from balconies and lead flats are not at all infrequently connected with the drains.

There is another thing on this floor which can be noticed. There is sometimes an unaccountable smell in the drawing-room, and people puzzle themselves in all kinds of ways to account for it. It is generally noticed when people are sitting in a particular chair—which particular chair is a chair possibly most frequently sat in—one near to the fireplace. The smell noticed is a smell which comes up the tube that the bell-wire goes down. The bell-wire goes down into the basement. It may go into some part of the basement which is not very savoury, and foul air may be, and frequently is, taken up into the drawing-room or best bedroom. Or the wire may be in the basement passage close to the gas-light, and the products of combustion of the gas may pass up the wire-tube into the drawing-room or bedroom.

I must, I find, speak very rapidly about the basement, so I will just say that the sinks in the basement have their waste-pipes very frequently either directly connected with the drains or connected with the drains by bell traps. Of course this is a most dangerous state of things. For when the top of the bell trap is taken off, an opening into the drain is directly made. If the bell trap gets broken, no one is told of it, and the drain is ventilated into the house for months. On the other hand, if the top is left on and the bell trap is in a place where water does not get into it continually, or at all, the trap will get dry, and so become a ventilator of the drains into the house; so that this plan of having ventilating-pipes in the sinks, or of having bell traps in the floor of basements, is most dangerous, still more dangerous if the sinks are not used. Some think in this way:—oh! this sink is not used, there cannot be any harm in it! But there is, and much more harm too. For the water in the trap dries up, and so, as I have mentioned, foul air comes into the house.

The sinks, then, ought not to be directly connected with the drains, but should discharge through trapped gullies in the area; and not only so, but the waste-pipes of the sinks, whether upstairs or downstairs, ought to have siphon-traps, with traps and screws fixed immediately under the sinks. These waste-pipes are foul pipes even when not connected with the drains, and if you do not have siphon-traps immediately under the sinks, foul air will come in, especially during the night, and you will have a very serious nuisance caused in the house in this way. The same remarks I make about cisterns upstairs apply to cisterns in the basement. The water-closets in the basement are simpler forms of closets, and they are very frequently supplied from water cisterns by means of pipes which have merely a tap which you may turn off or on. This is a most mischievous plan, as the cistern may be emptied and foul air enter it. The closets in the basement, therefore, ought to be supplied by means of water-waste preventers, the best kind being the siphon-action water-waste preventers, which discharge two gallons of water as soon as you pull the chain. These 'preventers' are not only to prevent the water being wasted by the handle of the closet being fastened up, but also cut off the direct supply of the closet from the drinking cistern water.

The rain-water pipes ought to discharge on to the surface of the areas, where there ought to be siphon gullies connected with the drains.

The soil-pipes ought to be outside the house, and connected with the drain by plain stoneware bends, or, under certain circumstances, disconnected from the drains themselves by a trap with an open grating. Such a trap is called a disconnecting trap.

One of the water-closets in the basement is very frequently in an exceedingly improper position—either in the scullery or actually in the kitchen. I have known such to be the case several times; in one instance it was in the larder! Of course I need not tell you these are all very improper positions. These w.c.'s ought all to be outside the house. It is certainly better even in large houses only to have one closet *outside* than more, one of them being in the larder or kitchen.

DRAIN.

With regard to the drain itself, this is got at by opening down to it in the front area. It may be found to be an old brick-drain, in which case it ought to be taken out. Brick-drains are pervious, they allow the escape of foul air, and with contaminated air rats also get in the house. Wherever rats can get, foul air can go; and rats coming in through these holes may carry with them the poison of disease, such as typhoid fever. Rats generally go to the larder, and carry with them often the poison of such diseases, which are very largely spread by their poisons being taken in this way by rats into the milk and other foods, and also into the water in the cisterns.

Whether a brick-drain or a pipe-drain, it should be trapped before it is connected with the main

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sewer or cesspool. This trap, in the case of a brick-drain called a 'dip-stone' trap, is a brick pit with a stone across it from one side to another, and dipped into the water which remains in the pit. The object of this stone is to prevent foul air coming into the house. As a matter of fact the pit holds a large collection of foul matter and becomes a small cesspool, in fact, there is no difference between them. I have not unfrequently found the drains of houses discharging into a cesspool in the front area, with a dip stone across it to prevent the foul air getting into the drain. You can see at once that this is most mischievous, for the dip-stone pit contains a collection of filth, and keeps the air in the drain foul.

Now, what are the proper materials for drains to be made of? I will not take the case of an iron drain now. A drain may be made of glazed stone-ware pipes, which may be joined together in one of several ways. They may be laid 'dry,' *i.e.*, without any jointing material between the ends, in which case they are, of course, not water-tight; or they may have clay in the joints, in which case you cannot fill them with water—that is to say, they will not hold water under pressure. (If you fill them with water, by plugging at the lower end, the water will come out at the joints.) Or they may be laid with the pipes the wrong way. When the joints are made with clay they will very soon become leaky; and when that happens, the water oozes through the joints, filth collects in the trap, and it gradually plugs up the whole drain from one end to another. This may go on for years without being found out, and so cause the ground under the house to gradually become a large cesspool. This is an extreme case. Or they may be jointed with cement, and there are some other ways. They may be perfectly well jointed with cement, so as to be water-tight. The drains, then, should answer to this test, *i.e.* you should be able to plug them at the lower end, and fill them with water. They should not be under the house, if possible. In London we cannot help it as a rule. If under the house, the straighter the course of the drain the better. Do not let it wind about in order to get away from different rooms. The best thing is to have a straight course through and to see that it is water-tight. It should hold water like a tea cup. The drain must not be directly connected with the main sewer or merely separated by a siphon-trap; but there should be an air inlet into the drain between the siphon-trap and the house. This opening may be of different kinds. The best kind is that of a manhole for access to the drain and trap (so that the trap can be examined and cleared out at any time); the air inlet should be a grating either over the manhole or in the nearest wall opening into a pipe leading into the manhole.

People who are afraid of foul air coming out of these inlets put on a valve with mica flaps, so that the air can blow in but foul air cannot go out. But, if there are no D-traps under the water-closets and sinks, if the pipes are straight and sufficiently large ventilators are used, if the ventilating pipes go up above the roof and are not protected from the action of the wind, then I say you will never find foul air coming out at the air inlet though you will find that fresh air is drawn in. There can be no accumulation of foul air, and the air that may be occasionally forced out is the last fresh air that has entered. Should you, however, find foul air coming out you will know that there is something wrong with the drain, that the drain or siphon is plugged, so that this air inlet becomes most valuable in pointing out to us when anything is going wrong.

HINTS TO SANITARY INSPECTORS.

(*Continued from page* 556.)

CHAPTER III.

NUISANCE REPRESSION.

§ 12. *Definition of Nuisance.*

THE repression of nuisances is naturally the function specially appertaining to the holder of the office of Inspector of Nuisances.

In addition to keeping himself informed respecting all nuisances existing in his district which require abatement, Article 4 of the Order of the Local Government Board requires that—

> 4. On receiving notice of the existence of any nuisance within the district, or of the breach of any byelaws or regulations made by the sanitary authority for the suppression of nuisances, he shall, as early as practicable, visit the spot, and inquire into such alleged nuisance or breach of byelaws or regulations.

Nuisance is a word of very comprehensive meaning. The definition of it by Mr. Justice Blackstone is now perhaps somewhat hackneyed, but it will bear repetition. He says:—'Nuisance, *nocumentum*, or annoyance, signifies anything which worketh hurt, inconvenience, or damage. And nuisances are of two kinds; public or common nuisances, which affect the public and are an annoyance to all the King's subjects; and private nuisances, which may be defined as anything done to the hurt or annoyance of the lands, tenements, or hereditaments of another.' The Public Health Laws, of course, deal only with the public or common nuisances.

For ordinary purposes Sect. 91 of the Public Health Act, 1875 (*N.R.*, 1855, *Sect.* 8; *San.*, 1866, *Sect.* 19*), defines the following as nuisances, but it must be borne in mind that this does not include every nuisance at common law:—

> 1. *Any premises in such a state as to be a nuisance or injurious to health.*
>
> 2. *Any pool, ditch, gutter, watercourse, privy, urinal, cesspool, drain, or ashpit, so foul, or in such a state, as to be a nuisance or injurious to health.*
>
> 3. *Any animal so kept as to be a nuisance or injurious to health.*
>
> 4. *Any accumulation or deposit which is a nuisance or injurious to health.*
>
> 5. *Any house or part of a house so overcrowded as to be dangerous or injurious to the health of the inmates, whether or not members of the same family.*
>
> 6. *Any factory, workshop or workplace* (not already under the operation of any general act for the regulation of factories or bakehouses†),

* The abbreviations inserted in italics after a section of the Public Health Act signify the corresponding section and Act governing the subject in the Metropolis, to which the Act of 1875 does not apply. *N.R.*, 1855, and *N.R.*, 1860, stand for the Nuisance Removal Act of 1855 and 1860, respectively; *San.*, 1866, for the Sanitary Act, 1866; *San. Laws Amend.*, 1874, for the Sanitary Law Amendment Act, 1874.

† These words are repealed by the Factory Act, 1878, Sect. 101 of which provides that Sect. 91 of the Public Health Act, 1875, with

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not kept in a cleanly state or not ventilated in such a manner as to render harmless as far as practicable any gases, vapours, dust, or other impurities generated in the course of the work carried on therein, that are a nuisance or injurious to health, or so overcrowded while work is carried on as to be dangerous or injurious to the health of those employed therein.

7. Any fireplace or furnace which does not as far as practicable consume the smoke arising from the combustible used therein, and which is used for working engines by steam, or in any mill, factory, dyehouse, brewery, bakehouse, or gaswork, or in any manufacturing or trade process whatsoever; and

*Any chimney (not being the chimney of a private dwelling-house) sending forth black smoke in such quantity as to be a nuisance.**

It will be noticed that the particular annoyance complained of must be a nuisance *or* injurious to health, so that it is not necessary for injury to health to be proved to secure a conviction—though of course actual or threatened impaired health is the best index of the character of the nuisance. This is not a matter, however, in which the inspector will need to concern himself in any detail, as the question of injury to health will come more properly within the province of the Medical Officer of Health.†

§ 13. *Powers of Local Authority as to Nuisances.*

Such of the offensive conditions referred to in section 91 as need more exact definition will be treated at length in subsequent chapters. Meanwhile, it may be profitable to refer briefly to the way in which nuisances generally can be legally dealt with. And in this connection it is worthy of notice that Section 3 of the Public Health Act enacts that—

> *The provisions of this Act relating to nuisances shall be deemed to be in addition to and not to abridge or affect any right, remedy, or proceeding under any other provisions of this Act or under any other Act, or at law or equity.*

The subjects of privy accommodation, street cleansing, removal of refuse, keeping of animals, offensive ditches, water pollution, occupation of cellar dwellings, common lodging-houses, offensive trades and the like are specially dealt with in separate parts of the Public Health Act, and there are other nuisances, such as from noise (see 35 & 36 Vict. c. 61, sect. 2), village greens (20 & 21 Vict. c. 31), unfenced shafts of abandoned mines (Coal Mines Regulation and Metalliferous Mines Regulation Acts, 1872), pollution of rivers (Rivers Pollution Prevention Act, 1876), alkali works (Alkali Works Regulation Act, 1881), absence of water fittings in the metropolis (Metropolis Water Act, 1871), &c., that are regulated by special Acts of Parliament, the provisions of which must be read together with the general law affecting nuisances and their abatement.

Although the sanitary inspector has only to deal with legal proceedings for the repression of nuisances up to a certain point, it is essential for him to have a proper understanding of the principles upon which such proceedings are based, and of the acts or defaults for which they may legally be instituted. Section 92 of the Public Health Act provides that it shall be the duty of every local authority to cause to be made from time to time inspection of their district, with a view to ascertain what nuisances exist calling for abatement, and to enforce the provisions of the Act in order to abate the same; also to enforce the provisions of any Act in force within their district requiring fire-places or furnaces to consume their own smoke. It is for the purpose of making such inspections that inspectors of nuisances are appointed. If the local authority makes default in enforcing this section the Local Government Board can compel them to enforce it, or appoint a person to enforce it at the expense of the local authority (Sect. 299; *San.*, 1866, *Sect.* 49; *San. Laws Amend.*, 1874, *Sect.* 20).

§ 14. *Information as to Nuisances.*

Information of a nuisance may be given to the local authority by any person aggrieved thereby, or by any two inhabitant householders, or by any officer of the authority, or by the relieving officer, or by any constable or officer of the police force of such district. (Sect. 93; *N. R.*, 1855, *Sect.* 10.)

The person aggrieved or any single inhabitant or owner of premises may make complaint to a justice of the existence of a nuisance without the intervention of the local authority, and thereupon the same proceedings are to be taken as in the case of a complaint made to a justice by the local authority.*

The court may, if it thinks fit, adjourn the hearing of the summons for an examination of the premises where the nuisance is alleged to exist, and may authorise the entry into such premises of any constable or other person, with the same powers and under the same restrictions as if he were an officer of the local authority.† Such person may be authorised to do all necessary acts and to recover his expenses from the person on whom the order is made. (Sect. 105; *N. R.*, 1860, *Sect.* 13; *San. Laws Amend.*, 1874, *Sect.* 53).

On receipt of any information respecting the existence of a nuisance the local authority, if satisfied of the existence of a nuisance, must serve a notice [in Form A of Schedule IV. of the Act] on the person by whose act, default, or sufferance the nuisance arises or continues, or, if such person can-

respect to a factory, workshop, or workplace, not kept in a cleanly state, or not ventilated or overcrowded, shall not apply to a factory or workshop which is subject to the provisions of that Act relating to cleanliness, ventilation, and overcrowding, but shall apply to every other factory, workshop, or workplace. It is thereby declared that the Public Health Act, 1875, shall apply to buildings in which persons are employed, whatever their number may be, in like manner as it applies to buildings where more than twenty are employed.

* The provisoes to these definitions contained in Sect. 91 will be separately considered in the chapters devoted to 'Offensive Trades and Smoke Nuisances.'

† On the question of nuisances as they affect injury to health, the observations of Mr. Simon made before the Royal Commission on Noxious Vapours in 1878 deserve particular attention. Mr. Simon observed, 'the expression "injurious to health" in many of these discussions has been used in a sense to impose upon the person who is charged with the duty of protecting health an obligation to prove that typhoid fever, or small-pox, or dysentery, or ringworm, or something of that kind, some definite disease that we name in our catalogue of diseases, is produced by these vapours. I do not think we are bound, when it is a question of sanitary injury, to show injury of that kind. To be free from bodily discomfort is a condition of health. If a man gets up with a headache, *pro tanto* he is not in good health; if a man gets up unable to eat his breakfast, *pro tanto* he is not in good health. When a man is living in an atmosphere which keeps him constantly below par, as many of these trade nuisances which I have in my mind particularly do, all that is an injury to health, though not a production of what at present could be called a definite disease. I think that those who are fighting for public health may claim of the Legislature that any pollution of the air such as may make a common nuisance, either in stink or in dust, or which causes coughing, shall be called a nuisance injurious to health, and come for the Sanitary Act.'

* See Sect. 18 of the 'Hints.' † See Sect. 19.

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not be found, on the owner or occupier * of the premises on which the nuisance arises, requiring him to abate it within a time to be specified in the notice. Where the nuisance arises from the want or defective construction of any structural convenience, or where there is no occupier of the premises, notice is to be served on the owner.

Where the person causing the nuisance cannot be found, and it is clear that the nuisance does not arise or continue by the act, default, or sufferance of the owner or occupier of the premises, the local authority may themselves abate the same without further order. (Sect. 94; *San.*, 1866, *Sect.* 21.)

In the event of the local authority making default in doing their duty as regards the abatement of nuisances, the Local Government Board may authorise any officer of police acting within the district of the defaulting authority to institute any proceeding which the defaulting authority might institute, the expenses of such officer being claimable from the local authority. But the police officer may not for this purpose enter a house used as a dwelling without the occupier's consent or without the warrant of a justice. (Sect. 106; *San.*, 1866, *Sect.* 16; *San. Laws Amend.*, 1874, *Sect.* 19.) Thus his powers in this respect are less extensive than those of the local authority in whose place he acts.†

§ 15. *Service of Notices.*

Authorised forms for the notices required to be given under Sects. 94, 95, 96, and 100 of the Public Health Act are printed in Schedule IV., Forms A, B, C, and D. Sect. 266 enacts that notices, orders, or other such documents under the Act may be in writing or print, or partly in writing or partly in print; and, if they require authentication by the local authority, the signature of the clerk or the surveyor or inspector of nuisances is sufficient authentication. Notices as to nuisances are usually signed by the sanitary inspector, as concerning his department of work more intimately than the department of any other officer.

Notices, orders, and similar documents may be served by delivering them to or at the residence of the person to whom they are addressed, or, when addressed to the owner or occupier of premises, by delivering them or a true copy of them to some person on the premises. If there is no person on the premises who can be so served, the notices must be fixed on some conspicuous part of the premises. A notice may also be served by post by a prepaid letter, and if so served shall be deemed to have been served at the time when the letter containing it would be delivered in the ordinary course of post. For proving such service, it will be sufficient to prove that the notice, &c., was properly addressed and put into the post. Any notice required to be given to the owner or occupier of any premises may be addressed by the description of the 'owner'‡ or 'occupier' of the premises—naming them—in respect of which the notice is given, without further name or description. (Sect. 267; *Metropolis Local Management Act*, 1855, *Sect.* 221; *N. R.*, 1855, *Sect.* 35.) It is, however, desirable in all cases that when the name of the owner or occupier is known, it should be inserted in the notice.

§ 16. *Nuisances caused by two or more Persons.*

Under Sections 33, 34, and 39 of the old Nuisance Removal Act of 1855—still in force in the metropolis—much difficulty was experienced in enforcing any remedy in the case of nuisances caused by the acts or defaults of two or more persons, unless it could be clearly proved that the separate contribution of the person proceeded against would alone cause a substantial nuisance. Such proof was often from the nature of the case almost impossible; and Section 255 of the Public Health Act accordingly provides that the local authority or other complainant may institute proceedings against any one of such persons, or include all or any two or more of such persons in one proceeding, and any one or more of such persons may be ordered to abate the nuisance. Whenever in any proceeding relating to nuisances it is necessary to refer to the owner or occupier of any premises, it is sufficient to designate him as the 'owner' or 'occupier' of such premises without name or further description.

§ 17. *Nuisances outside District.*

Under the old Nuisance Removal Act, moreover, local authorities could not protect the inhabitants of their districts against nuisances existing therein, but originating in another district; and as it often happened that these nuisances were of a very serious character, Section 108 of the Public Health Act now provides that when a nuisance within the district of a local authority appears to be wholly or partially caused by some act or default committed or taking place without their district, the authority may institute proceedings in the same way as if the act or default took place wholly within their district; and this section extends to the metropolis so far as to authorise proceedings to be taken under it by any nuisance authority in the metropolis in respect of any nuisance within their district caused by something outside, and *vice versâ*.

§ 18. *Legal Proceedings.*

If the person on whom a notice to abate a nuisance is served makes default in compliance, or if the nuisance, although abated, is in the opinion of the local authority likely to recur on the same premises, complaint is to be made by the local authority to a justice, who issues a summons (Schedule IV., Form B, of the Act) requiring the attendance of the person on whom the notice was served before a court of summary jurisdiction * (Sect. 95; *N.R.*, 1855, *Sect.* 12). The giving of notice to abate a nuisance appears to be a condition precedent to a local authority taking proceedings before a justice against persons causing a nuisance, though a private individual may, under Sect. 105 of the Act,† take proceedings against such persons without giving any preliminary notice.

If the local authority are of opinion that summary

* The name of the occupier or owner need not be inserted. (See Sect. 15 of the 'Hints.') As to the service of notices, see Sect. 15; and as to nuisances caused by more than one person, Sect. 16.

† See Sect. 19 of the 'Hints.'

‡ The term 'owner' is defined by Sect. 250 of the Metropolis Local Management Act and Sect. 4 of the Public Health Act to mean 'the person for the time being receiving the rack rent of the lands or premises in connection with which the word is used, whether on his own account, or as agent or trustee for any other person, or who would so receive the same if such lands or premises were let at a rack rent.'

* Defined by Sect. 4 of the Public Health Act to mean 'any justice or justices of the peace, stipendiary, or other magistrate or officer, by whatever name called, to whom jurisdiction is given by the Summary Jurisdiction Acts or any Acts therein referred to.'

† See Sect. 14 of the 'Hints.'

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proceedings would afford an inadequate remedy, they may cause proceedings to be taken in the High Court of Justice to enforce the abatement and prohibition of any nuisance (Sect. 107; *N.R.*, 1855, *Sect.* 30).

If the Court is satisfied that the alleged nuisance exists, or that, although abated, it is likely to recur, the Court is to make an order on the person served requiring him to comply with all or any of the requisitions of the notice, or otherwise to abate the nuisance within a specified time; or an order prohibiting the recurrence of the nuisance and directing the execution of works necessary to prevent recurrence; or an order both requiring abatement and prohibiting the recurrence of the nuisance. The Court may by order impose a penalty not exceeding 5*l.* on the person on whom the order is made, and is also to give directions as to the costs (Sect. 96; *N.R.*, 1855, *Sect.* 13). A form of order is given in Schedule IV., Form C, of the Act. The order may be appealed against to the Court of Quarter Sessions (Sect. 269; *N.R.*, 1855, *Sect.* 40), and if such an appeal is made, no liability to penalty is to arise, nor may any proceedings be taken or work done until after the appeal is heard, if it be persevered in (Sect. 99; *N.R.*, 1855, *Sect.* 16). It is to be observed that under the Nuisances Removal Act of 1855 (Sect. 14) a person causing a nuisance is not liable to a penalty unless he disobeys an order prohibiting it or requiring its abatement. The Act of 1875, however, gives power to the justices to impose a penalty by their order for the abatement or prohibition of the nuisance.

When the nuisance proved to exist is such as in the judgment of the Court to render a house or building unfit for human habitation, the Court may prohibit the house or building being used until it is rendered fit for that purpose. On being satisfied of the fact, the Court may determine its first order by another declaring the house habitable (Sect. 97; *N.R.*, 1855, *Sect.* 13.) This power is given as regards all nuisances affecting the habitableness of houses, of which overcrowding is one. Sect. 109 (*San.*, 1866, *Sect.* 36) makes, however, the further provision, as regards overcrowding, that where two convictions against the provisions of any Act relating to the overcrowding of a house have taken place within a period of three months (whether the persons convicted were or were not the same), a court of summary jurisdiction may, on the application of the local authority, direct the closing of the house for such period as the Court may deem necessary.

Where the person by whose act or default the nuisance arises, or the owner or occupier of the premises, is not known or cannot be found, the order of the Court may be addressed to and executed by the local authority. (Sect. 100; *N.R.*, 1855, *Sect.* 17.) A form of such order is given in Schedule IV., Form D, of the Act. It would seem, however, that the owner or occupier still remains liable for the existence of the nuisance, notwithstanding that the order is executed by the local authority. Any 'matter or thing' (the marginal note speaks of 'manure, &c.') removed by the local authority in abating any nuisance may be sold by public auction, and the proceeds applied in payment of the expenses incurred by the local authority with reference to such nuisance. (Sect. 101; *N.R.*, 1855, *Sect.* 18.) In an urban district offensive accumulations of manure, dung, soil, filth, , may be sold by the sanitary authority if not removed twenty-four hours after notice by the sanitary inspector (Sect. 49). Thus it is optional for an urban authority either to proceed under the last-named section, or to treat such accumulations as a nuisance to be dealt with under Sects. 92 *et seq.* and Sect. 101.

Neglect to obey an order renders the offending person liable to a fine of 10*s.* a day in the case of a nuisance to be abated, and 20*s.* a day in the case of a nuisance which has been prohibited. Moreover, the local authority may enter* the premises and abate the nuisance, and recover in a summary manner the expenses incurred by them from the person on whom the order is made.† (Sect. 98; *N.R.*, 1855, *Sect.* 14.) It is to be noted that the power of action thus given to the local authority is optional, and the superior courts could not grant a *mandamus* to compel them if they did not choose to do so.

§ 19. *Powers of Entry.*

The local authority, or any of their officers, *shall* be admitted into any premises for the purpose of examining as to the existence of any nuisance therein, or of enforcing any Act requiring fire-places and furnaces to consume their own smoke, at any time between 9 A.M. and 6 P.M., or in the case of a nuisance arising from any business at any hour when such business is in progress or is usually carried on.

Where a nuisance has been ascertained to exist, or an order of abatement or prohibition has been made, the local authority, or any of their officers, shall be admitted from time to time into the premises between the hours aforesaid, until the nuisance is abated, or the works ordered to be done are completed, as the case may be.

Where an order of abatement or prohibition has not been complied with, or has been infringed, the local authority, or any officer, is to be admitted from time to time at all reasonable hours, or at all hours during which business is in progress or is usually carried on, into the premises where the nuisance exists, in order to abate the same.

If admission to premises for any of the above purposes is refused, any justice on complaint thereof on oath by any officer of the local authority (made after reasonable notice in writing of the intention to make the same has been given to the person having custody of the premises), may, by order under his hand [Schedule IV., Form F, of the Act], require the person having custody of the premises to admit the local authority, or their officer, into the premises during the hours aforesaid; and if no person having custody of the premises can be found, the justice shall, on oath made before him of that fact, by order under his hand authorise the local authority, or any officer, to enter such premises during the hours aforesaid.

An order made by a justice for admission of the local authority or any officer on premises continues in force until the nuisance has been abated, or the work for which the entry was necessary has been done. (Sect. 102; *N.R.*, 1855, *Sect.* 11; *San.*, 1866, *Sects.* 20 and 31.)

No time is mentioned in the model form after which the order will take effect; but in the old form issued under the Nuisances Removal Act of 1855

* As to powers of entry, see Sect. 19 of the Hints.

† The mode of recovery of the cost and expenses of the execution of the provisions relating to nuisances is settled by Sect. 104 and Sects. 251-3 of the Public Health Act, but these do not concern the inspector

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twenty-four hours was given to the occupier after the service of the notice.

Any person who refuses to obey an order under this section is liable to a penalty not exceeding 5*l.* (Sect. 103; *N.R.*, 1855, *Sect.* 36.)

The order having been granted and admission obtained, it behoves the officer making the inspection to proceed with it regularly and systematically, the actual existence of the nuisance at the time of inspection and at the time of complaint being exactly ascertained, and the probability of its recurrence being inquired into. The facts ascertained should be promptly reduced to writing, and the local authority should by formal resolution place upon record the decision arrived at after perusal of the report, in order to ground further proceedings.

It is important to bear in mind that the authority has no power to enter upon premises to execute sanitary works until after disobedience to an order of a justice. The well-known case of Tinkler *v.* Wandsworth Board of Works (27 L. J. Ch. 342) settled this point very clearly.

Other sections of the Public Health Act give powers of entry as follows:—

Section 41 (*San.*, 1866, *Sect.* 4) authorises the local authority, on the written application of any person stating that any drain, water-closet, earth-closet, or cesspool, on or belonging to any premises is a nuisance or injurious to health, to empower their surveyor or inspector, after twenty-four hours' written notice to the occupier, or, in case of emergency, without notice, to enter such premises, with or without assistants, and cause the earth to be opened for the examination of the drain, &c. No hours for such inspection are laid down, and no power is given by the section to the local authority for the enforcement of their order, if admission be refused; but the powers of Section 102 are sufficient for the purpose, and there is, moreover, the power of entry under Section 305, to be presently referred to.

Section 58 authorises a local authority supplying water by measure to have access to and be at liberty at all reasonable times to remove, test, inspect, and replace any meter or other instrument for measuring water. No provision seems to be made here for refusal to permit admission, and Section 305 does not apparently apply.

Section 85 requires the keeper of a common lodging-house to give free access *at all times* to any officers of the local authority to any part of the house, under a penalty of 5*l.** Where the Local Government Board have empowered a local authority to make bye-laws as to houses let in lodgings (Sect. 90; *San.*, 1866, *Sect.* 19; *San. Laws Amend.*, 1874, *Sect.* 47), it is usual for such bye-laws to contain a clause similar to the above, giving free access at all times to the sanitary officials.

Section 98 (already referred to) gives power of entrance to the local authority for the purpose of performing the necessary works, where a person causing a nuisance neglects to carry out an order of a justice.

Section 119 authorises a justice, on complaint being made on oath, to grant a warrant to any officer of a local authority to enter any building in which such officer has reason for believing that there is kept or concealed any diseased or unwholesome animal, carcase, meat, or other food intended for sale for the food of man. The penalty for obstruction in this case is 20*l.*

Section 137 gives powers of entry to local authorities and their officers on any premises or vessel for the purpose of executing or superintending the execution of any regulations issued by the Local Government Board in time of any exceptional epidemic.*

Section 305 enacts that whenever it becomes necessary for a local authority or any of their officers to enter, examine, or lay open any lands or premises for the purpose of making plans, surveying, measuring, taking levels, making, keeping in repair, or examining works, ascertaining the course of sewers or drains, or ascertaining or fixing boundaries; and the owner or occupier refuses to permit such inspection, the local authority may, after written notice, apply for an order authorising such inspection; and, on such order being granted, the local authority or their officers may enter on such lands between 9 A.M. and 6 P.M.. Except in case of emergency no entry is to be made or works commenced unless at least twenty-four hours' notice has been given.

Any person who wilfully obstructs any member of the local authority or any person duly employed in the execution of any of these or other provisions of the Public Health Act, is liable to a penalty of 5*l.* When the occupier of any premises prevents the owner from obeying the law, a justice may, by order, require such occupier to permit the execution of the necessary works, and if he fails to comply with such order, he is liable to a penalty of 5*l.* for every day of non-compliance. An occupier refusing without sufficient cause to state the name of the owner of the premises he occupies is liable to a similar penalty (Sect. 306; *N.R.*, 1855, *Sects.* 36 and 37).

It may be here added that under the Public Health (Water) Act 1878 (41 & 42 Vict. cap. 25), a rural sanitary authority who have served a notice on an owner to provide a proper water supply, and whose notice has been disregarded, may enter upon the premises and execute all necessary works (Sect. 3, Sub-sec. 3), Sects. 102 and 103 of the Public Health Act applying until the works are completed, in the same manner as if an order had been made for the abatement of a nuisance. Section 7 of the same Act further provides that if a rural authority, or their officers, or any persons duly authorised by them, have reasonable ground for believing that any occupied dwelling-house within their district is without a proper and sufficient supply of wholesome water, they shall be admitted into the premises for which such supply is required, or from which the water supply may be derived, so as to ascertain whether or not such house has such a supply within a reasonable distance. Sections 102 and 103 of the principal Act apply in this case also.

The powers of entry into factories and workshops of inspectors of factories, who may take with them an officer of the sanitary authority, have been already sufficiently referred to in Sect. 6 of these 'Hints.'

(To be continued.)

The Bournemouth Improvement Commissioners and Urban Sanitary Authority have increased the salary of Mr. George Robert Andrews, the Surveyor, from 250*l.* to 300*l.* per annum.

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* In the metropolis the duty of supervising the common lodging houses is placed exceptionally under the charge of the metropolitan police, so that London sanitary inspectors have no duties with regard to their supervision.

* The powers of police officers under Sects. 105 and 106 to enter premises in certain cases has already been dealt with in Sect. 14.

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WATER SUPPLIES IN AMERICAN CITIES.

By an American Correspondent.

THE inhabitants of New York City are peculiarly fortunate in having a water supply which, though at present inadequate to supply the ever-increasing demands of a huge metropolis, is nevertheless sure to bring into their houses a perfectly pure and beautiful article. Dr. C. F. Chandler, President of the New York Board of Health and Professor of Chemistry in Columbia College, said in presenting his report upon 'The Sanitary Chemistry of Waters,' some years ago : 'The character of the Croton watershed is of a nature to guarantee water of the best quality. Mountains and hills of Laurentian gneiss receive the rainfall, which is quickly absorbed and filtered by the pure siliceous sands and gravels, to gush out in numberless springs feeding the brooks which bear the sparkling waters to the ponds, which serve as natural storage reservoirs. From these flow the large streams which, by uniting, form the Croton River. This is finally expanded by the dam at the head of the aqueduct into a broad deep lake, the *fountain reservoir* or *Croton Lake*, in which the quiet waters deposit the finer sediments, and thus undergo a final purification before they are admitted to the aqueduct.' Here then is where the celebrated Croton water comes from that we hear so much about. In a word, the streams are not polluted by factories, &c., and nature and art combine in keeping them pure.

I have said that the supply was inadequate. The Croton aqueduct furnishes about 95,000,000 gallons daily—a dangerously small amount for such a city. Perhaps the worst fear that haunts the average New Yorker is the fear of a prolonged drought. Even when the reservoirs are full, water is scarce, and it is more often the case than not for those living on the third storeys to have their water carried up to them, even though they have all the facilities for drawing it themselves. The present aqueduct is to be enlarged by an additional conduit and storage capacity. This conduit will have a diameter of twelve feet, and a length of 26 miles. It might be noticed here that certain engineers advocate bringing the water from the far-off lake through iron and syphon pipes, and thus do away with dams, aqueducts, &c. This, however, is plainly not feasible, on account of the number of pipes that would be required. The editor of the *Sanitary Engineer*, one of the very best authorities on such matters, says that to lay these pipes it would take at least 200,000 tons of material. The proposition is of such magnitude that the people have begun to suspect 'jobbery,' and consequently will not listen to it; whereas the proposed aqueduct will furnish the water in sufficient quantities, equally well, and at a normal expense.

The great evil, however (and one that twenty aqueducts would not remedy), is the enormous and criminal waste of water. How to prevent this is the greatest sanitary problem of the age in this country at least. The Bell waterphone is used in some cities, as in Cincinnati, to detect waste. The meter system is in vogue in most of the large New England cities. In Providence, Rhode Island, the proportion of meters to the services opened in 1882 was 48·3 per cent. New York will doubtless adopt this system fully before the expiration of this year. There are about 7,000 meters already in use. A very serious question arises in this connection : will the meter system put a premium upon uncleanliness? If people are taxed for their water, will they not go without water? In Providence, however, where the system has been carried out most completely, *a specified tax is paid by the owner of property, whether water is used or not*; and only the *excess* over this specified amount, as registered by the meter, results in an extra charge. This is the only way in which the difficulty can be met, and under such a system, the premium would not only rest on uncleanliness but that on carelessness would be removed; it would, therefore, accomplish one of the great ends of sanitary science.

Philadelphia has the unsavoury reputation of having the worst water in America. This city, the largest in the world, next to London, receives its water, not from pure lakes and uncontaminated springs such as supply the New York system, but from the two rivers that flow on either side of its business centre, and which unite not far from its southernmost point. Those who live east of a certain section, the inhabitants of the suburbs of Kensington, Frankford, Richmond, &c., get their water from the Delaware; and those who live west of this section, and in the more fashionable districts of West Philadelphia, Germantown, and Chestnut Hill are supplied from the Schuylkill River. The crying evil which has afflicted this long-suffering community is due to the presence of factories, and mills on the banks of the rivers, *above* the tapping points. The authorities have only within the past month begun to grapple with this evil; and a special loan has been proposed of 500,000 dols. for the construction of a sewer from Manayunk (about eight miles above the city proper, and the principal manufactory suburb on the Schuylkill) to below the last tapping point on the river. This sum, be it noted, is small, amounting to only fifty cents a head; and delay in accomplishing the work would be unpardonable. These factories, on the Schuylkill especially, empty their deleterious substances directly into the river, the waters from which, in all their reeking filth, are straightway pumped into our reservoirs—of course, the manufacturers have no thought as to the effect of the filth upon a great city's population. Their object is to get rid of it in the quickest and most convenient way. But now for the first time legislative action seems likely to enforce some restraint upon them. This proposed sewer will not remove all the impurities from the Schuylkill, but it will be a great beginning. Its maximum discharge below the last tapping point will be equal, it is estimated, to about one-sixth of the estimated minimum flow of the river; and fully one-sixth of the city's daily supply comes from Manayunk. The chief engineer of the city says that the sewer in its entirety will be seven miles long, and will ultimately be carried to the junction of the Schulylkill with the Delaware, and emptied below the city into the latter river. The plan contemplates a sufficient grade to carry the sewage by the force of gravity, and thus do away with any necessity for pumping.

No such legislation has as yet been proposed for the benefit of the equally unhappy portion of the community that draws its supply from the Delaware. This water has been pronounced by skilled medical authority as 'impure to an offensive and dangerous degree.' A short distance above the point where the supply pipes to the Kensington Waterworks are laid the tramingo canal empties into the river, and not far away 'Gunner's Run' unites with it.

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'These vents,' says a physician who has made the condition of affairs under discussion a special study, 'are what may be aptly termed sinks of corruption, into which drain an extensive district—covered not only by dwellings, but by various kinds of factories, dye houses, slaughter yards, &c. Southward in the immediate vicinity we find pouring their vile contents into the river the outlets of two or three sewers of sub-draining areas.' Physicians attribute to the impurity of the Delaware water the epidemic of diarrhœa which has been prevailing to a dangerous extent in that part of the city.

Some of the Philadelphia hotels and large business houses have made a water supply of their own by digging artesian wells. But even here, in one instance at least that has been brought before your correspondent's notice, the lurking enemy was found subtly hidden under the form of *arsenic*, with which the water was tainted. Great care should be taken in testing the well water before it is used, for otherwise the remedy may prove worse that the disease.

This evil of an impure water supply is the curse of many smaller cities, also, notably those on the Ohio and Mississippi rivers. It is a question which assumes a graver aspect every year, and which must be met by every community sooner or later.

The meter system is not in favour in Philadelphia. The waste of water is, perhaps, greater than in any other city in the world, because no attention has been directed to ascertain its causes or bring about its diminution. Pains are now being taken to increase the water supply, and in a few weeks the pumping capacity will be increased by at least 30 per cent. The chief engineer says, that out of the 65,000,000 gallons pumped every day, not less than 35,000,000 (or more than one-half the supply) are wasted in one way or another. This state of things is chiefly due to the leaking attachments in the houses. (An ordinary washstand allowed to run day and night with a pressure of thirteen pounds wastes 1,440 gallons of water per day, or 525,600 gallons per year.) Through the energy of the chief engineer a reform has already begun. Night inspectors are being sent out who, by the aid of the waterphone attached to the service stop-cock of the house, can not only detect whether water is flowing through the service-pipe, but are enabled to determine whether the waste is caused by a leak or a running spigot. The next day an inspector is sent to the house where the leak has been discovered, and notifies the occupants to have it stopped. Some curious reasons are given for wasting the water. One man told the inspector he left his hydrant running to make his drains sweet. Another said that his plumber advised him to keep the water running to prevent the pipes from bursting. The pipes, be it noticed, were not bomb-proof, which argues for the shrewdness of that plumber.

Our large cities derive their water supplies from limited areas. Large tracts of land are consequently taken to hold the water, and this is necessarily hurtful to the farmers and other holders of land. A great deal of property has been ruined by the construction of these basins and aqueducts. The Croton valley people above New York complain that they will be made penniless by the construction of the new reservoir, and the inhabitants of the Sudbury valley, whence Boston gets its supply, have protested against the erection of new supplies in their midst. But there is positively no help for this sad condition of affairs. The majority in the cities must survive at the expense of the minority in the country. The latter may move their dwelling-place—though at great loss to themselves, perhaps—but the hard-working citizen must live in the city.

It may be noticed in this connection that a bill is now pending before the Connecticut Legislature to create a joint commission, composed of members of the State Board of Agriculture, Board of Health, and the Fish Commission, to investigate the pollution of streams, and to utilise for agricultural purposes the excreta which are now drained into the streams. Whether this bill will be favourably received, or whether the commission, if created, will accomplish anything, remains to be seen.

I would like to say a word about the Chicago supply before closing. The source of the supply is Lake Michigan, from a point about two miles north-east of the city. In the early days of the city the water was taken from the lake at a short distance from the shore, and not far from the mouth of the Chicago river, which flows through the heart of the city. In 1855 a system of sewerage was inaugurated, the sewage being discharged into the river and thence into the lake. In consequence of this the water was seriously contaminated in a few years, and the necessity of procuring a supply from a point in the lake at a greater distance from the shore became imperative. It was decided to construct a tunnel under the lake two miles in length, with a land shaft at the western and a lake shaft at the eastern extremity, the shafts to be protected by cribs, or hollow pentagonal breakwaters. The horizontal diameter of the tunnel was fixed at 5 feet, and the vertical diameter at 5 feet 2 inches, a size sufficient to supply one million inhabitants at the rate of fifty gallons a day for each person, the average quantity used at that time. A new tunnel was built in 1874, 7 feet in diameter and 31,490 feet long. The capacity of this new tunnel is 100,000,000 gallons per diem, and the total cost, including the erection of pumping works and a stone structure in place of the old wooden crib in the lake, 1,638,250 dollars.

It is the pride of Chicago that its water supply, when uncontaminated by sewage, is the purest with scarcely an exception, of any in the world. Aside from ordinary sand, which sometimes gets into it during heavy storms, about 75 per cent. of the sediments are composed of diatomaceæ, found in all water that is exposed to the air and sunshine. In the spring, however, when there are freshets, the water of the Chicago river, into which the sewage of 600,000 people flows, is carried dangerously near the crib where the water is tapped for the city, and contamination follows. This evil has not yet proved serious; but apprehension for the future has suggested the necessity of extending the tunnels further out into the lake, which will probably be done before long. The bulk of the sewage is carried into the Mississippi River, which is a good thing for Chicago, and a bad thing for those towns on that river that draw their supplies from its waters.

The use of reservoirs for the storage of water has been abandoned. Standpipes are used in their stead, and pumping engines are kept in reserve in case of emergencies.

There has been as yet no legislation regulating the water supply; and the waste of water, except in certain unusual cases, is not punishable by law. For domestic usage there is no restraint; large establishments and elevators pay by measurement, taken

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by the meter. Persistent waste of water is punished by shutting off the supply.

At South Evanston, one of the suburbs of Chicago, an infiltration basin is soon to be erected, from which the water will be pumped into tanks, and thence distributed throughout the village. The lake shore has a beach of clean sand, on which the basin will be built, with a bottom nine feet below the surface of the water in the lake. The water is purified by its filtration through the sand; and the plan is a novel one in this country. It is to be commended for its simplicity and its inexpensiveness, as well as for the purity of the water it affords.

THE Egremont Local Board and Urban Sanitary Authority have increased the salary of Mr. John Bowly, their clerk, from 40*l.* to 60*l.* per annum.

TESTIMONIALS.—Mr. Henry Percy Boulnois, the late Surveyor to the Corporation and Urban Sanitary Authority of Exeter, now Surveyor to the Corporation and Urban Sanitary Authority of Portsmouth, has been presented with a silver epergne and salver, and an illuminated list of the committee and subscribers (numbering several hundreds). The presentation was made by the Mayor at a public luncheon, over which he presided. Mr. Thomas Broughton, the late Surveyor to the Corporation and Urban Sanitary Authority of Warwick, has been presented with a carriage clock bearing the following inscription on a silver plate: 'Presented by the workmen of the Warwick Town Council to Mr. Thomas Broughton, C.E., as a mark of their respect, good-will, and best wishes, on his resigning the office of borough surveyor, June 1883.'

METROPOLITAN LOCAL GOVERNMENT (OFFICERS') ASSOCIATION.—This association, which holds its meetings at the Law Institute, Chancery Lane, has elected for the sixth time Mr. W. E. Greenwell, of Marylebone, as its president, and Mr. Frank Dethridge, of Paddington, and Colonel Hughes, of Plumstead, as its vice-presidents, for the ensuing year. The association has appointed a committee, consisting of Sir William Charley, Q.C., and others interested in the question of local self-government, to watch the Municipality for London Bill, of which the Legislature has given notice.

SALARIES IN CORNWALL.—The following particulars in reference to the payment of medical officers of health, may be of interest to some of our readers:—St. Austell medical officer of health receives 70*l.* a year, and Bodmin 45*l.*, and both unions receive one-half from Government; Camelford pays 30*l.*, and the official is also a district medical officer; the same is the case at Liskeard, where 60*l.* is paid; at Penzance, where 80*l.* is paid; at Stratton, where 40*l.* is paid; and at Truro, where 100*l.* is paid; St. Columb pays 50*l.*, Launceston 50*l.*, Falmouth 70*l.* None of the medical officers of health for Redruth Union are sanctioned by the Local Government Board, and in Helston there were no medical officers of health at all.

As a matter of record, the names of the sixteen members who voted in the minority on the 19th ult. in favour of Mr. P. O. Taylor's motion will be of interest:—A. Arnold, J. Barran, R. P. Blennerhassett, Jacob Bright, T. Burt, Sir T. Chambers, A. Cohen, J. Cowen, W. Y. Craig, R. Ferguson, J. R. Holland, J. Howard, H. Labouchere, Sir W. Lawson, T. Roe, J. E. T. Rogers; tellers, Mr. P. A. Taylor and Mr. Hopwood.

VENTILATORS.—At the National Health Society's Exhibition, London, Messrs. Robert Boyle & Son, the well-known ventilating engineers of 64 Holborn Viaduct, London, and Glasgow, have been awarded for their patent Self-acting Air Pump Ventilators, the highest and only prize given for Exhaust Ventilators. At the International Exhibition at present being held at Cork, Messrs. Boyle's Patent Self-acting Air Pump Ventilators are applied for the ventilation of the Exhibition building.

THE

SANITARY RECORD.

JULY 15, 1883.

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The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

PLUMBING AND DISEASE.

Mr. Ernest Hart will feel much obliged by any references to or copies of reports concerning epidemics due to imperfect house drains or bad plumbing work, as well as of copies of any local regulations made under bye-laws or private Acts for insuring proper supervision over plumbers.

THE COMPULSORY PRINCIPLE IN VACCINATION.

REMEMBERING Mr. Peter Taylor's idiosyncrasies, it is perhaps hardly surprising that the speech in which he supported his motion concerning the Vaccination Acts on June 19 should have resolved itself into an attack on vaccination all along the line as a useless and mischievous operation. Probably by these tactics he added to the measure of his own defeat, since the House of Commons evidently felt that whatever the terms of the motion might be, it was, in effect, the whole principle of vaccination that was being attacked. That only fifteen members out of a House of 302 could be found to follow Mr. Taylor into the lobby is a sufficiently good index of the general state of public opinion on the subject of vaccination. An extremely vigorous and wrong-headed knot of agitators have succeeded by more or less unscrupulous methods in giving a fictitious importance to their cause; and they even grandiloquently give forth that they are preparing an answer to the convincing figures of Sir Lyon Playfair's eloquent speech. The country will, however, feel that it has heard enough for the present of anti-vaccinators' perversions; and the leaders of the movement will probably have sufficient sense to refrain from courting another defeat in the House of Commons for some considerable time.

Leaving, therefore, as a matter practically placed beyond dispute, the general question of vaccination as a prophylactic against small-pox, it may not be without profit to consider briefly the ostensible purpose of Mr. Peter Taylor's resolution, that it is 'inexpedient and unjust to enforce vaccination under penalties upon those who regard it as inadvisable and dangerous.' In other words, if a parent be too idle, or careless, or prejudiced to have his child vaccinated, he is to be allowed to plead 'conscientious objections' as an excuse for the non-performance of his plain duty as a citizen. Now if, as Sir Lyon Playfair well observed, 'a man could take small-pox and isolate himself, we might have no right to interfere with his doing so. But every man with small-pox was a distinct focus of contagion, and must injure the whole community.' It has come to

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be an article of belief with some people that the compulsory clauses of our vaccination laws were adopted in a hurry, under pressure of an epidemic of small-pox. Nothing could be further from the fact. So long ago as 1840, the British Medical Association, then known as the Provincial Medical and Surgical Association, feeling the importance of facilities being given for the general performance of vaccination, secured the passing of an Act providing at the public cost gratuitous vaccination to all who chose to avail themselves of the privilege. But the public apathy in taking advantage of these facilities was found to be so great that when the Epidemiological Society inquired into the subject of small-pox mortality in 1853, it reported that 'on the part even of those parents who were glad to avail themselves of public vaccination for their children, there existed an habitual procrastination, which left the children exposed to small-pox at the very period of life when they are most liable to its ravages.'

The Epidemiological Society recommended therefore that vaccination within three months of birth should be made compulsory by penalty, it being the unanimous conclusion of the Committee appointed to consider the subject 'that no measure which does not render vaccination compulsory, in some form or other, will be sufficient to insure the efficient protection of the population of this country from the ravages of small-pox.' The Vaccination Act of 1853, embodying the principle of compulsion, was accordingly passed, and infantile vaccination was 'henceforth to be counted among those conditions necessary for the maintenance of life, which a parent should not be entitled to withhold (any more than food or clothing) from his offspring.'

The clear intention of the Act of 1853 was to insist upon each child being vaccinated, the offence of non-compliance not being purged until the vaccination of the child had been accomplished. But there were two defects in the Act which seriously hampered its efficacy, and which made it necessary in the long run to pass another Act providing more perfect machinery. The one was that there was no officer whose business it was to set the law in motion, and the other that the terms of the Act did not provide for the case of a continuance of neglect on the part of a parent in securing the vaccination of his child. The principle of compulsion was affirmed by the Legislature on at least three occasions in Acts of 1861 and 1863, but it was not until 1866 that the Government, becoming convinced through the inquiries of the Medical Department of the Privy Council that some more efficient machinery was necessary if small-pox was to be attacked effectually, introduced a Bill enforcing vaccination within three months, or, under certain circumstances, within six months of birth, under penalties which were to be capable of continuous enforcement until the vaccination was completed. This Bill was introduced under a Liberal Ministry by Mr. Bruce, now Lord Aberdare. A change of Government, however, prevented the question being dealt with until 1867, when the then Conservative Government brought in and passed an Act which is still in force as the Vaccination Act, 1867.

Under Section 31 of this Act an order for the vaccination of a child under fourteen years of age may be made by a justice of the peace if he sees fit, upon the application of the registrar [now vaccination officer], and such order may be renewed or repeated again and again, as often as may be requisite, until the vaccination of the child is effected. This is not, it is true, said in so many words in the section, but it is the view of the clause which has been invariably held, and it has been distinctly confirmed by the Court of Queen's Bench. It was after the passing of the Act of 1867 that the league of anti-vaccinators began to make themselves heard; and it was judged expedient by the Government of the day to propose to the House of Commons in the session of 1871 the appointment of a Select Committee 'to inquire into the operation of the Vaccination Act (1867), and to report whether such Act should be amended.' The labours of this Committee, as is well known, were most thorough and complete. The Committee was composed of men of all shades of opinion, including Mr. Peter Taylor himself; and after a most careful and painstaking hearing of the allegations of the anti-vaccinators, they unanimously agreed to a report 'that the cow-pox affords, if not an absolute, yet a very great protection against an attack of small-pox, and an almost absolute protection against death from that disease. That if the operation be performed with due regard to the health of the person vaccinated, and with proper precautions in obtaining and using the vaccine lymph, there need be no apprehension that vaccination will injure health or communicate any disease.'

This report was naturally regarded as of the most convincing character by the House of Commons, and it was some years before the opposition to vaccination again manifested itself in any aggressive form in the House. A number of attacks upon it were made from time to time by Mr. Taylor, Mr. Hopwood, and others, but it was not until the Session of 1880, when Mr. Dodson truckled to the anti-vaccination party by introducing a Bill for the abolition of multiple penalties, that the question reached an acute stage. The fate of Mr. Dodson's Bill is well-known. It was instantly met by the strongest and most indignant protest on the part of all the learned societies; deputations from the British Medical Association, the Royal College of Physicians, the Royal Society, and other scientific bodies waited upon Mr. Dodson, to point out the mischief that would inevitably arise if the Bill was passed; and in the end the proposal was quietly withdrawn. Since then the matter has again slept until Mr. Peter Taylor's new resolution, which met with so unmistakable a reception on the 19th ult.

It would be inaccurate to say that there have not been cases in which the Vaccination Acts have pressed somewhat severely upon individuals; but if the argument that on this account the Acts ought to be repealed were pressed to its logical conclusion and made of general application throughout our social system, we should have anarchy immediately. Probably no one has put the case more crisply than Mr. Simon, who in his historic papers relating to the 'History and Practice of Vaccination' observed:

'It being assumed, as the limitary principle of human law, that men may be left free to follow every inclination which relates only to themselves, it would certainly seem foreign to the principle of legislation to insist on one's caring for one's own health; and, if a man's having small-pox could affect none but himself, little need be said against his right of having it *ad libitum*. Even in this light, however, it deserves consideration that he who indulges a preference for small-pox does so to the detriment or danger of his neighbours; and, as they often suffer by his infection, so they may reasonably

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claim to be heard on that question of his privilege. Still the main object of the obligatory law is not to prevent adults from circulating—if they be so minded—a personal taste for small-pox; its object is to prevent them from compelling (for in this case allowing amounts to compelling) their children to incur the worst perils of that disease. The option which the Vaccination Acts restrict is not that of a conscious agent deliberately preferring for himself the dangers of small-pox to the securities of vaccination. The so-called "liberty" is that of exposing unconscious infants to become the prey of a fatal and mutilative disease. It is this liberty of omissional infanticide which the law has taken courage to check.' And for these reasons it is evident that the compulsory character of our vaccination laws must be maintained in its integrity.

NOTES OF THE MONTH.

THE TEMPERATURE OF THE THAMES.

ABOUT the middle of 1844 regular observations of the temperature of the Thames were commenced on board the *Dreadnought* hospital ship, the thermometers being placed in a perforated wooden trunk and suspended, so that they were two feet below the surface of the river, and as the ship rose and fell with the tide that depth was always maintained. With the exception of the years 1857 and 1870 they were continued up to the end of 1879; but after Jan. 1, 1871, the observations were made from the *Scorpion*, and latterly from the *Royalist*. The extremes of temperature during that time have been very large, the lowest, 29°·4, having been observed on Jan. 15, 1850, during which month temperatures below 32° were recorded every day from Jan. 1 to the 24th. The highest temperature, viz., 77°, was recorded on June 21; but as the instrument was sent away to be repaired the day after, there is some doubt about it, but 75°·4 was recorded on July 20, 1859. The average temperature of the river during the thirty-three years was 51°·7, being higher than that of the air at Greenwich by 1½°. The highest mean temperature for any month was 71°·1 in July 1859, the mean air temperature being 69°. Mean monthly air temperatures were recorded at Greenwich of 69°·5 in July 1852, of 69°·3 in July 1868, the mean river temperature being 70°·6 and 68°·3 in these months respectively.

As these interesting observations have been discontinued since 1879, the Committee of the City Corporation, which acts as the Port Sanitary Authority, has given instructions to Mr. J. J. Symons, F.R.S., to organise a scheme of observations at their expense, which was completed on May 19 last. As the pier of the cattle market at Deptford, from which they will be taken, is fixed and not floating, the thermometer which is to record the temperature at two feet under the surface is attached to a float which rises and falls with the tide in a perforated wooden shaft, so that the water is constantly changing in it. The other thermometer is let down to the bed of the river enclosed in a metallic tube and in a similar shaft to the other. The thermometers are wound up when the observations are to be recorded, which is done by unlocking a door in the front of the upper part of the wooden trunk. The indices are readily set, and the instruments, which are a carefully made form of Six's thermometer, cannot readily get out of order. They have been carefully compared at Kew, so that trustworthy observations of the temperature of the Thames will be again commenced, and it is to be hoped continued without further interruption.

In addition to these a set of air thermometers has been placed in a Stevenson's screen on a grass plot opposite to the offices, so that a new climatological station for London will be started, and will be very useful for comparison with the Greenwich observations and those taken inland at Old Street Road, Regent's Park, and Kew, which, with the others, will afford a more complete knowledge of the London climate than we have hitherto had.

RECENT MORTALITY IN EUROPEAN CAPITALS.

M. MOTTEROZ, of the Bureau of Statistics, Paris, France, gives some interesting comparisons, formed in reviewing the mortality returns of the capitals of Europe for the first quarter of the present year. London, with its population of nearly 4,000,000 of inhabitants, shows the smallest death-rate—22·1 per 1,000 annually; and this although three epidemic diseases—measles, scarlet fever, and whooping-cough—occasioned a very considerable number of deaths during the period. St. Petersburg, on the other hand, gives the highest mortality—40·6 per 1,000 of its inhabitants yearly. Typhoid fever and diphtheria prevailed in this city with great intensity. Berlin gives a mortality rate equal to 24·3 per 1,000 per annum. During the three months under review croup caused 663 deaths in its population of 1,200,000. The rate of Brussels was 25·7, of Paris 27·3, of Stockholm 27·8, of Vienna 31·1, and of Madrid 36·4. The mortality in this last capital is always high. Measles alone was the cause of 402 deaths during the quarter, and this is regarded as an enormous mortality for a population of 400,000 inhabitants.

MILK ADULTERATION.

THE Board of Health of New York have resolved that the following section shall be added to the Sanitary Code already in force in that city:—'Section 207. Any milk found to be adulterated either by the addition of water or other substance, or by the removal of cream, or which has been brought into, or is held or offered for sale, in the city of New York, contrary to the provisions of Section 186 of the Sanitary Code, may be seized and destroyed by any inspector or other officer of this department authorised to inspect milk.'

BUILDING SOCIETIES AND ARTISANS' DWELLINGS.

SIR T. BRASSEY, speaking at the twenty-first annual meeting of the Working Men's Club and Institute Union, improved the occasion by contrasting the power of the State, with individual energy and intelligence. To this end he instanced the total loans advanced under the Artisans and Labourers' Dwellings Improvement Act of 1875 which could not be compared with the amount expended by the building societies in England and Wales. The total loans sanctioned under the Act of 1875 were under 2,000,000*l.*, of which more than 1,500,000*l.* had been spent in the one town of Birmingham. This limited effort could not, he said,

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...compare with the rapid growth and far more active ... business achievements of the building societies. ... between the returns of July 1880, and those of ... the aggregate income of those societies ... increased from 10,417,000*l.* to 18,694,000*l.*, and ... aggregate assets from 31,864,000*l.* to 37,000,000*l.*, ... these statistics represented a most gratifying ... in the homes of the people compared ... which the exertions of the State must have pro... an insignificant result.

RECENT HEALTH LEGISLATION IN MICHIGAN.

THE following legislation affecting the public health has been secured in Michigan during the last session of the Legislature. An Act to prevent the sale and use of toy pistols, which provides that it shall be unlawful for any person to give, sell, or furnish to any child under thirteen years of age any cartridge of any form or material, or any pistol, gun, or other mechanical contrivance specially designed or arranged for the explosion of the same; an Act which requires physicians and householders to give notice to the Board of Health immediately upon the occurrence of a case of either small-pox, scarlet fever, diphtheria, cholera, or any other disease dangerous to the public health, in his practice or family; the law also provides for a payment of a fee of ten cents. for every such case reported by a physician; an Act of doubtful propriety, which removes the superintendency of the collection, compilation, and publication of vital statistics from the Secretary of the State Board of Health to the Secretary of State, by whom they will probably be published without the supervision of a medical expert; an Act which provides that it shall be the duty of a health officer, in the absence of existing regulations from his own board of health upon the outbreak of a contagious disease, immediately to investigate the subject, and in behalf of the board of health of which he is an executive officer to order the prompt and thorough isolation of those sick or infected with such disease so long as there is danger of their communicating the disease to other persons; to order the prompt vaccination or isolation of persons who have been exposed to small-pox; to see that no person suffers for lack of nurse or other necessaries because of isolation for the public good; to give public notice of infected places by placard on the premises, and otherwise if necessary; to notify, promptly, teachers or superintendents of schools concerning families in which there are contagious diseases; to supervise funerals of persons dead from scarlet fever, diphtheria, small-pox or other communicable disease which endangers the public health; to disinfect rooms, clothing, and premises, and all articles likely to be infected before allowing their use by persons other than those in isolation; to keep the president of his own board of health and the Secretary of the State Board of Health constantly informed respecting every outbreak of a disease dangerous to the public health, and of the facts so far as the same shall come to his knowledge respecting sources of danger of any such diseased person or infected article being brought into or taken out of the township, city, or village of which he is the health officer. This Act also provides payments for the services of the health officer at not less than 2·00 dols. per day while actually employed. An Act was also passed regulating the practice of medicine in the State, which provides that it shall be deemed unlawful for any person to practice medicine in Michigan without having registered with the county clerk and having actually practised medicine in the State continuously for five years, or being a graduate of any legally authorised medical college in this or any other country.

DISQUALIFICATION OF MEMBERS OF LOCAL BOARDS.

UNDER Rule 64 of Schedule II. of the Public Health Act 1875, any member of a local board who 'in any manner is concerned in any bargain or contract entered into by such board, or participates in the profit thereof, or of any work done under the authority of the Act in or for the district,' is disqualified from being a member of such board. Mr. John Morley has recently introduced a Bill into the House of Commons to exempt from the operation of this provision the proprietors of newspapers in which advertisements inserted by the Local Board appear. The Bill provides that 'a member of a local authority shall not vacate his office by reason only of his having any share or interest in any newspaper in which any advertisement is inserted relating to the affairs of such local authority or of the district subject to the jurisdiction of such local authority, anything in any general or local Act of Parliament to the contrary notwithstanding.' For the purposes of this measure, 'local authority' means any 'local board' or 'improvement commissioners' as defined by the Public Health Act of 1875. In addition to Mr. Morley, Mr. Stuart-Wortley, Mr. Stewart Macliver, and Mr. Joseph Cowen have backed the Bill, which appears a very reasonable one.

TYPHOID FEVER AND DRAIN AIR.

IN reporting on the health of Preston during the past year Mr. Pilkington refers to the prevalence of typhoid fever there, and although the disease did not assume an epidemic form the outbreak is instructive as showing the mischievous influence of drain-air. Altogether there were forty-eight deaths registered from the disorder, and in numerous instances the deceased persons were employed at factories. An examination of several mills showed that, though there were relative degrees of badness, in almost all the privy accommodation was open to grave objection. In factories of several storeys in height the general plan was to have one or two small closets opening from each room, and communicating with a large shaft down which the excreta falls into a cesspool at the bottom. In the weaving sheds of one storey in height, there were the same small closets opening directly from the workroom, and emptying into large cesspools. No ashes or other absorbent matters found their way into these receptacles, which of necessity contained a large quantity of fluid, and gave off a most offensive odour. The closets themselves were so small, confined, and badly ventilated, that each person during the time of using them was exposed to the foul gases from the cesspool below, and this very often when, from the high temperature of the workroom just left, the body was in a heated condition, and so more liable to absorb the dangerous effluvia. Moreover, each time that the closet door was opened (and in a shed containing a large number of looms this was con-

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stantly going on from morning till night) a considerable amount of foul air was drawn into the shed, to the danger of those working there. There are many difficulties in dealing with this question, since the nature of the work requires that the closets shall be within easy reach of the operatives, and that no cold air shall be admitted into the workrooms from without, whilst the position of many of the existing cesspools prevents the possibility of their being drained. In several factories some improvement has been effected by building out iron platforms at the level of each storey, open to the air, upon which each person has first to pass before entering the closet. As many hours in each day are spent by the operatives within the walls of the factory, the subject is one which bears very strongly upon the health of the great bulk of the working classes in such a town as Preston, and Mr. Pilkington hopes to be able during the present year to devote some special attention to this important matter.

THE MEDICAL DEPARTMENT OF THE LOCAL GOVERNMENT BOARD.

SOME important changes in the officering of this department have recently been made. Mr. Netten Radcliffe, who has held the appointment of Assistant Medical Officer since the death of the late Dr. Seaton, has had to retire on account of mental infirmity, and his post has been conferred upon Dr. Thorne Thorne, who for a considerable period has taken a large share in the administrative work of the department. The vacancy thus left in the ranks of the inspectorate has been filled by the appointment of Dr. David Page, health officer for a combined district in Westmoreland, who has had a large and varied experience in sanitary work. For so small an office, the Medical Department has seen a good many changes of late. Since 1880 there have been no less than four new inspectors appointed out of a total staff of ten. Medical officers of health may take a certain amount of consolation from the fact that all four of the new inspectors have been recruited from their ranks. At the present time there are six ex-health officers on the staff—Dr. Buchanan (formerly for a considerable period Health Officer of St. Giles's), Dr. Ballard (Islington), Dr. Parsons (Goole), Mr. Spear (South Shields), Dr. Barry (Craven district), and Dr. Page (Westmoreland).

THE HYGIENIC VALUE OF MIRTH.

THERE is a considerable amount of truth in the following remarks extracted from the American *Popular Science Monthly*:—Mirth has an hygienic value that can be hardly overrated while our social life remains what the slavery of vices and dogmas has made it. Joy has been called the sunshine of the heart, yet the same sun that calls forth the flowers of a plant is also needed to expand its leaves and ripen its fruits; and without the stimulus of exhilarating pastimes perfect bodily health is as impossible as moral and mental vigour. And, as sure as a succession of uniform crops will exhaust the best soil, the daily repetition of a monotonous occupation will wear out the best man. Body and mind require an occasional change of employment, or else a liberal supply of fertilising recreations, and this requirement is a factor whose omission often foils the arithmetic of our political economists. To the creatures of the wilderness affliction comes generally in the form of impending danger—famine or persistent persecution; and under such circumstances the modifications of the vital process seem to operate against its long continuance; well-wishing nature sees her purpose defeated, and the vital energy flags, the sap of life runs to seed. On the same principle an existence of joyless drudgery seems to drain the springs of health, even at an age when they can draw upon the largest inner resources; hope, too, often baffled, at last withdraws her aid; the tongue may be attuned to canting hymns of consolation, but the heart cannot be deceived, and with its sinking pulse the strength of life ebbs away. Nine-tenths of our city children are literally starving for lack of recreation; not the means of life, but its object, civilisation has defrauded them of; they feel a want which bread can only aggravate, for only hunger helps them to forget the misery of ennui. Their pallor is the sallow hue of a cellar-plant; they would be healthier if they were happier. I would undertake to cure a sickly child with fun and rye-bread sooner than with tidbits and tedium.

THE WEST KENT COMBINED DISTRICT.

THE vacancy in the health officership of the West Kent Combined Sanitary District caused by the resignation of Dr. C. O. Baylis, to which we referred in our issue of last March (p. 408), has now been filled up by the appointment of Mr. Harris Butterfield, Health Officer of the Borough of Bradford, Yorkshire. The number of applications for the office was considerable, and in making their selection the joint committee have exercised a wise discretion. Mr. Butterfield's experience as Medical Officer of Health at Bradford, which has extended over a period of ten years, has qualified him in an eminent degree for the fresh duties he has now entered upon. The remuneration attaching to the office has been fixed at 800*l.* per annum.

TYPHUS FEVER IN LIVERPOOL.

THE apprehensions entertained last year that fever would increase in Liverpool were unfortunately well founded, for while during 1881 the deaths ascribed to fever were 292, as many as 593 were registered in 1882, of which no less than 384 were from typhus. Dr. Stopford Taylor gives prominence in his annual report to this fatal prevalence of fever, which is especially instructive in indicating the necessity of some notification of infectious disorders. Generally speaking, the fever was found associated with unsanitary property and crowded courts and alleys, but in the early part of the year an outbreak occurred in the West Derby District, where the houses were comparatively new, the situation open and elevated, and should have been healthy, but that some of the houses were occupied by a class similar to those dwelling in the lowest parts of the city. When fever was introduced it spread rapidly among these people. In April the death of a man from fever was reported, and eight members of his family, dwelling in different parts of the city, subsequently contracted the disease from communication first with this man, and afterwards with other members of the family who became ill. In June an outbreak occurred in a street which contained a number of courts having houses back-to-back, and incapable of thorough ventilation. The inhabitants were poor, the houses crowded and dirty, and the atmosphere

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fœtid; in fact, it was just one of those places where zymotic disease, when once introduced, spreads rapidly. The total number of cases that came under the notice of the health officer was 2,643, or 1,436 more than in the previous year. Referring to the necessity of early notification, Dr. Stopford Taylor observes that if sanitary measures are to be fully efficient in preventing disease, it is absolutely necessary that the earliest possible information should be given to the health officer, and not delayed as it was, in fact, in certain instances during the recent outbreak, until the infection has been spread by a number of sympathising visitors. However desirous many persons may be to nurse the sick at their homes, it is utterly impossible to so isolate cases of infectious disease in small or even ordinary-sized houses, as to secure the other members of the family and the public from the danger of infection; Further, by the early removal of the sufferers to clean and airy wards, with skilled and trained nurses to attend upon them, they have a much better chance of recovery than if left at home to the kind but inexperienced management of relatives and friends.

THE SUPERVISION OF DAIRIES.

In accordance with a promise made on behalf of the Government last session, the Lord President of the Council has introduced a Bill providing for the transference of the duty of dairy supervision and regulation from veterinary to sanitary authorities. We pointed out at the time when the Act of 1879 was passed the absurdity and futility of imposing upon authorities charged with the stamping out of contagious diseases amongst cattle the duty of supervising the sanitary condition of dairies; and subsequent experience has been uniformly corroborative of our view. By the new Bill the powers now vested in the Privy Council with regard to dairies, cowsheds, and milkshops will be transferred to the Local Government Board. These powers include those of making orders (1) for the registration with the local authority of all persons carrying on the trade of cowkeepers, dairymen, or purveyors of milk; (2) for the inspection of cattle in dairies and for regulating the lighting, ventilation, &c., of dairies and cowsheds; (3) for securing the cleanliness of milkshops and milk-vessels; (4) for prescribing precautions against infection or contamination; and (5) for authorising a local authority to make regulations for these purposes. The local authority in question is to be the urban or rural sanitary authority, except in the metropolis, where it is to be the Corporation and the Metropolitan Board of Works. The Bill provides that any officer of a local authority may enter any land, or dairy, or other building for the purpose of ascertaining whether an order under the Act is complied with or not. If a local authority fail to enforce any order in force in their district, the Local Government Board can empower some person to enforce it and determine his remuneration for this. But the expense so incurred is to be paid by the local authority. Where, however, a dairy or cowshed is declared to be in an area infected with cattle plague, &c., the orders of the Privy Council are still to prevail.

At a recent meeting of the Bermondsey Vestry the inspector reported that he had seized about 4 cwt. of salt and fresh horse-flesh, which was being sold as beef at a butcher's shop.

THE PUBLIC HEALTH

DURING JUNE 1883.

The mean temperature during last month at the Royal Observatory, Greenwich, was 59°·0; it exceeded by 0°·8 the average June temperature in 100 years, and was higher than that recorded in any corresponding month since 1878. An excess of temperature prevailed on sixteen days of the month, while on each of the other fourteen days it was below the average. The warmest day of the month was the 29th, when the mean was as much as 70°·6, and showed an excess of 8°·8; the coldest day was the 7th, when the mean did not exceed 51°·6, and was 6°·8 below the average. Rain was measured at Greenwich on thirteen days during the month to the aggregate amount of 1·4 inches, which was 0·6 of an inch below the average June rainfall in sixty-one years. During the first half of this year the rainfall amounted to 10·2 inches, which was nearly an inch below the average rainfall in the same period of sixty-one years. The sun was above the horizon during 494·5 hours in June, and 127·5 hours of bright sunshine were recorded at Greenwich; this amount was as much as 25·5 hours below the average in the corresponding month of the five years 1878–82. Easterly winds prevailed during the early part of June, and south-westerly winds during the last week of the month. The recorded amount of ozone was above the average of the corresponding period of recent years, a considerable excess prevailing during the last eight days of the month.

In the twenty-eight large English towns now dealt with in the Registrar-General's weekly return, which have an estimated population of more than eight and a half millions of persons, 22,951 births, and 12,583 deaths were registered during the four weeks ending 30th ult. The annual birth-rate, which had been 36·3 and 35·0 per 1,000 in the two preceding months, further declined to 34·7 during June, and was 0·5 per 1,000 below that which prevailed in the corresponding period of last year. The lowest birth-rates in these twenty-eight towns last month were 22·4 in Plymouth, 29·9 in Huddersfield, and 30·1 in Bradford; in the other towns the rates ranged upwards to 41·7 in Cardiff, 43·6 in Sunderland, and 44·5 in Nottingham. In London the birth-rate was only 33·6 per 1,000, whereas in the twenty-seven provincial towns it averaged 35·7.

The annual death-rate in the twenty-eight towns, which had been 26·1, 24·1, and 21·3 in the three preceding months, further declined during the four weeks of June to 21·0, which corresponded with the rate that prevailed in these towns in June 1882. The lowest annual rate of mortality last month in the twenty-eight towns was 15·1 in Norwich. The rates in the other towns, ranged in order from the lowest, were as follow:—Bristol, 15·3; Leicester, 15·4; Portsmouth, 15·6; Brighton, 16·1; Bradford, 16·5; Birkenhead, 17·2; Oldham, 17·3; Cardiff, 17·4; Bolton, 17·5, Halifax, 17·6; Nottingham, 17·9; London, 18·0; Hull, 18·5; Plymouth, 18·8; Salford, 18·9; Birmingham, 19·3; Leeds, 19·4; Derby, 19·7; Wolverhampton, 19·9; Huddersfield, 21·7; Sheffield, 22·1; Preston, 22·4; Sunderland, 22·5: Newcastle-upon-Tyne, 24·0; Liverpool, 24·3; Blackburn, 24·4; and the highest rate during the month 24·6 in Manchester. While the death-rate did not exceed 18·0 in London, it averaged 20·0 in the twenty-seven provincial towns.

The 12,583 deaths from all causes in the twenty-eight towns during the four weeks of June included 474 which were referred to measles, 335 to diarrhœa, 324 to scarlet fever, 257 to whooping-cough, 151 to 'fever' (principally enteric), 89 to diphtheria, and 24 to small-pox. In all, 1,654, or 13·1 per cent. of the total deaths resulted from these principal zymotic diseases, equal to an annual rate of 2·5 per 1,000. This zymotic rate in the twenty-eight towns last month, owing principally to the greater fatality of diarrhœa, showed a slight increase upon the rates in recent months, but was below the rate from the same diseases in these towns during the corresponding period of 1881 and 1882, when it was 3·1 and 2·9 per 1,000 respec-

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tively. The death-rate from the principal zymotic diseases in London during June was equal to 2·6 per 1,000, and slightly exceeded the average in the twenty-seven provincial towns, among which the rate ranged from 0·5 in Derby and in Halifax, and 0·6 in Norwich, to 4·7 in Newcastle-upon-Tyne, 4·9 in Sheffield, and 5·1 in Liverpool. Measles caused the high zymotic death-rate in Newcastle-upon-Tyne and Liverpool, and scarlet fever in Sheffield.

Measles was in June, as in the preceding month, the most fatal zymotic disease in the twenty-eight large towns. The annual death-rate from this disease, which had risen steadily in the four preceding months from 0·22 to 0·59 per 1,000, further increased to 0·72 during June, and exceeded the rate returned in any month since May 1882, when it was 0·89 per 1,000. In London last month the death-rate from measles was 0·91, whereas in the twenty-seven provincial towns it did not average more than 0·55 per 1,000, but was equal to 1·1 in Sheffield, 2·2 in Liverpool, and 2·7 in Newcastle-upon-Tyne. The fatality of diarrhœa, as is usual at this season of the year, showed a marked increase during last month; the annual rate of mortality from this disease in the twenty-eight towns, which had been 0·49 and 0·48 in the corresponding periods of 1881 and 1882, was 0·51 during June. The death-rate from scarlet fever in the twenty-eight towns, which had been 0·36 and 0·44 in April and May, further rose to 0·49 during June; in the corresponding periods of 1881 and 1882 the death-rate in these towns from this disease were 0·42 and 0·43 respectively. No death from scarlet fever was returned last month in Brighton, Norwich, Plymouth, Salford, Huddersfield, or Halifax; in the other towns the death-rates from this disease ranged upwards to 1·5 in Leeds and 2·6 in Sheffield, these two towns having shown each month since the commencement of the current year the highest rates of mortality from scarlet fever. The annual death-rate from whooping-cough in the twenty-eight towns, which had been 0·61 and 0·86 in the corresponding months of 1881 and 1882, was last month only 0·39, and showed a further decline from the rates returned in recent months. In London the death-rate from this disease was 0·34 per 1,000, while in the twenty-seven provincial towns it averaged 0·43 per 1000, and was equal to 0·9 in Liverpool and in Cardiff, and 1·0 in Manchester. The rate of mortality from 'fever' (principally enteric), which had steadily declined in the four preceding months from 0·43 to 0·29, further fell during June to 0·23, a lower rate than has been recorded in any month since July 1881, when in the twenty towns then dealt with in the Registrar-General's weekly returns it was only 0·20 per 1,000. In London the rate of mortality from fever did not exceed 0·15 per 1,000, whereas it averaged 0·29 in the twenty-seven provincial towns, and was equal to 0·7 in Liverpool, and 1·0 in Portsmouth. The death-rate from diphtheria, which had been 0·15, 0·16, and 0·13 in the three preceding months, was again 0·13 during June. In London the diphtheria death-rate was 0·21 per 1,000, but in the twenty-seven provincial towns it did not exceed 0·07; of the 25 deaths referred to this disease in these provincial towns last month, 6 occurred in Birmingham, 5 in Liverpool, and 3 in Sheffield. Twenty-four fatal cases of small-pox were recorded in the twenty-eight towns during the four weeks of June; of these, 12 occurred in London, 7 in Newcastle-upon-Tyne, 2 in Birmingham, and one each in Liverpool, Manchester, and Hull. Judged by the returns of the Metropolitan Asylum Hospitals, the prevalence of small-pox in London showed last month a further decline; the number of small-pox patients under treatment in these hospitals, which had been 90, 73, and 70 at the end of the three preceding months, further fell to 65 at the end of June. The average weekly number of new cases admitted to these hospitals, which had steadily declined from 19 to 10 in the five preceding months, was 11 in June.

The rate of infant mortality in the twenty-eight towns, measured by the proportion of deaths under one year of age to births registered, was equal to 123 per 1,000 during June, which was below that recorded in the corresponding periods of 1881 and 1882, when it was 132 and 129 per 1,000 respectively. In London the proportion of infant mortality was 122, and in the twenty-seven provincial towns it averaged 124 per 1,000 births, and ranged from 57 in Brighton, 83 in Norwich, and 88 in Bristol, to 148 in Plymouth and in Sunderland, and 162 in Liverpool.

The death-rate from diseases of the respiratory organs, judged by the metropolitan returns, corresponded with that recorded in the same period of 1882. The average weekly number of deaths referred to these diseases in London during June was 214, and the annual death-rate was equal to 2·8 per 1,000, against 2·9 and 2·8 in the corresponding periods of 1881 and 1882. The annual death-rate from these diseases in Liverpool last month was 5·1 per 1,000.

The causes of 270 of the deaths in the twenty-eight towns during the four weeks of June were not certified, either by a registered medical practitioner or by a coroner. These uncertified deaths were equal to 2·1 per cent. of the total deaths, which corresponded with the rate in the same period of 1882, though it was considerably below the proportion in either of the preceding months of this year. The proportion of uncertified deaths in London was but 0·9 per cent., while it averaged 3·1 in the twenty-seven provincial towns, ranging from 0·6 and 0·9 in Portsmouth and Birkenhead, to 5·4 in Salford, 6·3 in Oldham, and 6·4 in Hull.

Among the population living in the outer ring of suburban districts around London, estimated at rather more than a million persons, the annual death-rate from all causes was equal to 14·1 per 1,000 during June, against 13·7 and 14·3 in the corresponding periods of 1881 and 1882. The annual death-rate from the principal zymotic diseases in these suburban districts, which had been 1·1 and 1·7 per 1,000 in the two preceding months, further declined in June to 1·6. During the four weeks ending June 30, 32 cases of whooping-cough, 22 of diarrhœa, 21 of measles, 17 of diphtheria, 16 of scarlet fever, 13 of 'fever' (principally enteric), and 2 of small-pox were recorded in the outer ring. The fatality of measles and of whooping-cough showed a marked decline from that recorded in the preceding month; while that of diphtheria and of fever showed an increase. Seventeen of the 32 deaths from measles occurred in the district of West Ham; 9 fatal cases of whooping-cough, 6 of scarlet fever, and 4 of diphtheria were also returned in West Ham. The two fatal cases of small-pox that occurred during June in the outer ring were recorded in Hornsey and West Ham sub-districts respectively.

SPECIAL REPORTS.

THE BERLIN SANITARY EXHIBITION.

(*Continued from page* 569.)

(FROM OUR OWN CORRESPONDENT.)

THERE is ample evidence in exhibits that have separate buildings in the open grounds for their exposition, and in lesser exhibits within the main building, that the wise philanthropy which fosters the industries and increases the profits of such far-seeing and far-reaching manufacturers as Krupp and Spindler takes a still wider and more public range in the city of Berlin itself.

Perhaps the most attractive and popular of the larger external exhibits is that of the People's Kitchen, a bright, cheery, social 'cookshop,' free from the sights and smells which repel all but the very poor and needy from the mere cookshops of London and its suburbs. The doors of this attractive exhibition eating-house are crowded daily by all sorts and conditions of men and women hungry or curious for a plenteous, wholesome, and nutritious noonday meal for threepence; or if curiosity rather than appetite prompts them a smaller portion may be had for three-fifths of the price.

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There are fourteen such kitchens in Berlin, opened by an association which exists under imperial patronage, and which owes its existence and no little of its success to a fine combination of good sense and good feeling in Frau Lina Morgenstern, who opened the first kitchen as far back as 1868, and whose excellent work has been sung in verse by the poet Carl Heiniz, one of the oldest and most active of its members.

Very matter of fact and scientific people, however, are the members of this association. They start with the very self-evident proposition that the well-being of humanity is dependent upon the supply in the first instance of three essential primal wants—food, clothing, shelter; the first being the more essential, as giving and maintaining the strength to work for the other two. Where these wants are unsupplied, or ill-supplied, the society regards any solution of the great social questions of the day as insoluble, for they who are thus physically afflicted become morally sick, and sink to the criminal classes. Pursuing a wholly practical and scientific career, it proposes not to supply food for the destitute but food so scientifically chosen and so artistically prepared that the poorest may be daily so nourished by at least one good meal a day as to prevent his becoming sickly and poorer from lack of food that is neither appetising nor nourishing.

According to the society, such a meal must consist of two groups or forms of food stuff; first, blood and muscle formers, to which belong all albuminous foods, such as eggs, meat, milk, cheese, and pulse; and secondly, fat-forming and heat-giving foods, in such forms and quantities as by the process of respiration are consumed in the body at a rate which maintains it at a healthy temperature. In this latter class they place all hydrocarbons and non-nitrogenous foods, such as starches, sugars, cellulose, fatty, and gum foods. In addition to these, they say, the body requires nutritive or alkaline salts, mineral matters, and such nerve stimulants as alcohol, thus showing that the Blue Ribbon movement has not yet extended to Berlin.

Of the three classes of substances thus particularised, the association holds that the following proportions are necessary for a midday meal :—

	Albumen.	Fatty matter.	Hydrocarbons.
For working man or woman..	59 grammes	34 grammes	160 grammes
Old man or woman	40 ,,	30 ,,	85 ,,
School-child	49 ,,	21 ,,	80 ,,

The society find the following proportions in every 100 parts of the annexed foods :—

	Water.	Albumen.	Fatty.	Hydro-carbons.
Lean beef	75·9	21·9	0·9	—
Pork.....	60·2	13·9	24·9	—
Eggs	71·1	15·5	12·5	—
Wheaten meal	12·5	11·8	1·2	73·6
Black bread	46·2	8·2	—	44·2
Pease	14·2	22·5	2·5	58·2
Lentils	14·2	26·0	2·0	55·0
Fresh green pease	80·0	6·1	0·4	12·4
Sauerkohl (pickled cabbage)	88·8	1·7	0·3	7·9

The latter, rather a frequent dish with the German lower classes, is thus one which the society can hardly recommend and be true to their object and principle. What they do do is to prepare a midday meal of different constituents from day to day that comprises the relative proportion of albuminous, fatty, and hydrocarbonaceous matters they find necessary for a working man, consisting of one litre of cooked vegetables, with a piece of meat, weighing 75 grammes. This constitutes a portion for which they charge 25 pfennigs, or 3*d.* of our money; or half a portion, consisting of four-fifths of a litre of cooked vegetables, and a piece of meat weighing 25 grammes, may be had for 15 pfennigs.

In company with a Berlin gentleman who takes great interest in the association, I dined in the People's Kitchen at the exhibition, and receiving at the clerk's office a ticket in exchange for 3*d.*, I exchanged the ticket at the counter for a large white basin, wherein a thin slice of boiled beef lay on the top of a large quart measure of what to an English eye looked very much like thick Irish stew, minus the meat. I might have had a basin with a slice of uncooked ham instead of beef, but not being born to the German manner of eating ham, I left that to my friend. The people being their own waiters, we took our dinners to a rather crowded table, and applied the spoon, the meat being too thin and light to need knife, fork, and plate —that expenditure going in nutriment for the benefit of the customers which the establishment would otherwise have had to spend in crockery and cutlery. The whole proved a toothsome and satisfying meal, with which I was the more content from the knowledge that the physiologist had had as much to do with my dinner as the cook, and that their labours had been united by the most friendly feeling, which is more than I can say for many a more pretentious dinner eaten by me.

'Die Berliner Volksküchen' Company progresses and pays; beginning with one kitchen in 1866, it re-opened three more the next year, and the following year increased the number to ten. It added another the succeeding year, and then there was a lull, for by 1879 there were but twelve, and now the number is fourteen. From the opening of the first kitchen to September 28, 1882, 28,392,172 dinners were sold, of which 5,138,944 only, or less than one-fifth, were full, the rest being but half portions, so that the means or the appetites of the customers are moderate. But it will be seen that the so-called 'half' portion consists of four-fifths of the vegetable portion of the whole, and I found that with a good appetite and the best possible desire to do justice to my dinner, that that quantity was rather more than I could consume.

In the exceptionally inclement and poverty-stricken winter of 1881-82 the association was induced to open its kitchens for an hour and a half in the morning and for a like period in the evening of each day for the supply of four-fifths of a litre of soup, or half a litre of tea with milk and sugar, and a little loaf of bread, for 6 pfennigs, or a fraction more than three farthings. The loss of such a meal was keenly felt by the poor when the coming spring brought it to an end, and one poor customer in good verse comforted himself with the reflection that November storms would bring it again, and was not disappointed, for each succeeding winter has found tea or soup in the People's Kitchen. The society is no loser by its goodness, for its income from its commencement to January 1882 was 3,801,197 m. 75 pf.; while its expenditure for the same period was but 3,751,543 m. 32 pf.

But this good work of providing the poor with cheap, nutritious, and well-cooked food away from their homes gave birth to an agency not only to teach the poor to provide it for themselves, but to teach good cookery and housewifery to the girls and women of all classes of the community. This association was also founded by Mrs. Morgenstern, and has been carried on prosperously since 1873, mainly by means of lessons given in cooking schools, very much after the fashion that has of late years become so popular in this country. But the instruction has, like the principles of the People's Kitchen, a more scientific basis, if I am to judge from the little library of books I found at one of these schools opened as an exhibit in the exhibition grounds. To that library Mrs. Morgenstern has contributed more than one work written and published by her on 'The Nourishment of Humanity.'

The exhibition cookery school provides a dinner every day, prepared by the fairest of pupil cooks, under the direction of Mrs. Morgenstern herself, or a competent lady teacher, but could not provide for more than twenty-five covers, so that there were many disappointments, which it was hoped the school by enlargement would prevent. The dinner does credit to the gastronomic taste and culinary skill of the school, and is served in a neighbouring tent fitted up by Wolff and Cadmus, on an admirable floor of glazed tiles that approach very much the substance of glass, laid down by C. A. W. Schoen, of Hamburg.

Looking inside the school one sees how much prepared foods are in favour with the Germans, for one finds there quite a little exhibition of dietetic preparations. Here is

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dietetic nutritive meal prepared by R. Kufeke, of Burgdorf, Hamburg, in two forms, one mixed with cane sugar for infants, and one unsweetened for invalids. The same firm also produces a mixture of similar meal, cocoa, and some other preparations, which are vended under the name of malt extract chocolate powder. There are also preserved vegetables, fruits, soups, fowl, &c., from the Lubeck Fabrik, while the Pumpernickelfabrik of Esoce & Sons, of Moabit, Berlin, sends all sorts of bread, including bread they baked so long ago as March 1882, but which is still moist, sweet, and tasty. For moistening the solids A. Behuche, of Wolgast, sends champagne-milk, whether alcoholised or not I cannot tell; but it would be a libel on the city brewery of Marseburg, patronised by the school, to say that either the black or bitter beer that firm provides is destitute of the stimulant. More teetotal drinks in the shape of seltzer, soda, and other waters are exhibited in the school by Kowarzik, chemist and apothecary of Berlin. Mocha essence is furnished by H. Trapp, of Strasburg, for the making of coffee; and Meiner, of Leipsic, provides Flesh Extract, for making soup without meat.

Still further to illustrate the art of economical and hygienic cooking, Reitschel and Henneberg, of Berlin, Vienna, and Cologne, have erected, in another part of the grounds, a kitchen for providing dinners for five or six hundred persons, and there exhibit the processes of cooking, recommended by them for hospitals, asylums, orphanages, prisons, and barracks.

Judging by these, and numerous other cookery exhibits of the exhibition, the mere surface observer might come to the conclusion that the chief characteristic of German cookery is as little meat as possible, and that in the smallest and most condensed form, to serve rather as a seasoning than as a substance. Germany is the land of Liebig, and Liebig is best known in this country to most people by his 'Extract of Meat;' and it is in this form that his name flourishes among the Germans at the German exhibition, where the German Meat Extract Co. glories in a separate pavilion, large of dimensions, and handsomely attractive. They are as proud of the nine golden medals and diplomas of honour, won by the genius of Liebig, as though they had been conferred upon themselves. They tell how cattle are so plentiful at Fray Bentos, in La Plata, that the sparse population combined against the herds that overrun the country and slaughter them, preserving only their hides and their fat, and leaving the good meat to perish, when Liebig, as much like a good German fairy as a good German chemist, appeared upon the scene with gigantic machinery and the magic of his genius to extract the essential nutriment of the good meat, and distribute it in tin caskets for the feeding of the peoples of other lands. The Company boast that they are slaughtering annually at Fray Bentos, one hundred and seventy thousand head of cattle, and that the figures go on increasing year by year.

But as we have already seen above, such success has provoked competitors, not to say rivals, in the meat extract trade, and the Carnepura Co. have also a large and handsome pavilion, into which streams of inquiring minds go, and ready fingers receive pinches of meat-powder with which they may make soup, or add a little flesh to much vegetables in any one of the numerous ways set forth in a list of directions which accompanies the powder. The process adopted by the company is that of drying all water out of the meat in the first instance, and thus enabling them to change it into a durable preparation of economical nutriment.

Any supposition, however, that the good folks of Berlin are not given to butchers' meat is at once removed by a visit to its municipal exhibit in the main exhibition building, where but a cursory examination of the plans, specifications, and other particulars of its great central cattle market and slaughter-houses, will at once remove the impression. Though their original erection was only commenced so recently as 1878, a large extension of the buildings has already been made. The total number of erections is fifty-three, standing on 11·76 hectares of ground. Forty-two millions of bricks were used in the buildings; and the total cost, including site, was 9,720,000 marks. There is room for 4,000 cattle, 30,000 sheep, 3,000 calves, 12,000 pigs; and the slaughter-houses provide for the killing and dressing of thirteen hundred head of cattle a day. There is also a dead meat market; and one is struck by the careful, complete, and thoroughly scientific provisions made for the inspection of both cattle and meat, and the certainty that no meat which is not in every respect fit for human food can enter into the consumption of the good people of Berlin. London or any large town of this country may study the plans and system of this great market with advantage to the health of its population.

But sanitary science goes further than eating and drinking all the world over; and so it does at the Berlin Exhibition, for there we learn of the existence and work of the Berliner Verein für Häusliche Gesundheitspflege, or, freely translated, Association for the Promotion of Care for Household Health. When one reflects that if health is not cared for in the household, it is very little use to care for it outside, the sound sense and good science upon which this association is based become apparent. This is a very practical society, too, for it is not content with diffusing among the poor and ignorant oral and printed information as to the laws of health and their requirements, but makes practical and useful arrangements, such as provide for medical attendance and medicine and nursing the sick at their own homes, for holiday and seaside resorts for the weakly and convalescent, and for the establishment of centres where pure milk may be obtained. As every good act is accompanied by instructive counsel, and every helper is a teacher, lessons so taught are all the better remembered and the more readily applied by the grateful recipients. It is gratifying to find that the work of such a society is spreading and encompassing the city.

Add to all this the institutions imperial, municipal, and charitable, which provide (in other ways, and wisely and well) for the feeding of the hungry, the clothing of the naked, the care of sick and insane, the reformation of the criminal, and the restoration of the fallen, and, above all, for training and instructing those that otherwise might fall, of which ample details are to be found in plans, models, and reports at this exhibition; and it will be seen that it testifies to a growing care for the conservation of body and mind in Germany.

(To be continued.)

THE AMSTERDAM EXHIBITION.

(From our Special Reporter.)

Though not ostensibly a sanitary exhibition, yet professing to bring together all that colonies export and all that mother countries send to their colonies, no exhibition ought to have been more rich in attraction and information to the student of men and manners, and above all the student interested in the amelioration of both, than the International Colonial Exhibition now on view at Amsterdam. But unfortunately, with the exception of those which Holland itself owns, and one or two minor exceptions, colonies are rather conspicuous by their absence from this exhibition; and of mother countries, that which has distinguished itself by colonising in all parts of the earth, Great Britain, makes the smallest show, the bulk of the exhibition being made up by France, Germany, and Belgium, the first a notorious failure as a colonising country, and the latter two destitute of colonial dependencies.

Nevertheless, despite these shortcomings, there is much at Amsterdam not only to interest but to instruct the humanitarian and sanitarian philosopher, scientist, and social reformer.

The exhibition itself shows what human industry and perseverance can achieve, for its site is divided into two parts by one of those canals of water which tell how they who made Amsterdam built it on sand banks rescued from

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the sea, while much of the main building is erected over the water itself. And yet the people thus dispersed and scattered on sand islets, doing battle with the wind and the waves of the stormy North Sea, became masters, as the section devoted to the Dutch colonies show, of some of the most favoured and most fertile places on the globe. The Dutch colonial exhibition building is itself situated in the best apology for good soil that could be made upon what so short a time ago was as sandy a waste as Holland had to show. Very realistic, too, is the park with its Java houses, its bamboo constructions, its conservatory of tropical plants, and the little 'kaboes' from which ever and anon issue the sounds of Indian music, that the very air may complete the 'transformation scene.' One crosses the water by a bridge built of 'petong bamboo,' which grows thicker than a man's arm, and of which the light and graceful, yet safely strong hanging bridges whereon the Indians pass securely across perilous places and passes are made. On the other side the bridge one is in the midst of bamboo houses, strong and secure without nail or screw, being made of bamboo canes tied together with bamboo rope or string, and one wonders how a people with such natural resources and skill, as other exhibits show the inhabitants of such houses to possess, should ever have been subjugated by a people who in their own poor apology for a native land have even now to keep the sea from washing it away with willow mats and sand heaps.

On the way to the building rich in exhibits from Java there is to be found the shed of *Atap*, where at stated times native girls dance strangely, yet not without grace, to the wondrously complaining sounds of the *gamelang*. Still more interesting and instructive is the house sent by the European residents of the presidency from Tegal illustrating the home life of the natives, that picture of life having much of reality imparted to it by the greyish-blue buffaloes which pasture in its neighbourhood.

The light within the Java building is wondrously toned in native fashion by gracefully-draped native white linen, which is not discoloured or injured by the heavy rains that ofttimes penetrate Java roofs. Very interesting are the tastefully disposed native curiosities sent by the Sultan of Solo, and the pictures by the native artist Rhaden Saleh, while from pictures on the walls of many scenes of many parts of and many places in Java one reads lessons of life in that great Dutch colony. Multitudinous illustrations of that life lie all around—the simple loom upon which the Java women weave the red and blue Sarong; the light chairs, made out of Palembang wood, for summer-houses; the warlike pirate prahs, and the Chinaman's boat-house, the varied dresses and flaunting handkerchiefs, and the thousand and one other things that tell how people live and move and have their being in Java.

The archives, museums, and geographical and scientific departments of the Dutch Government, as well as the results of private enterprise and research and individual collection, all contribute to make the exhibition, so far as the Dutch colonies are concerned, one of a highly interesting, instructive, and valuable character; describing, explaining, and illustrating their meteorology and magnetism, geology, mineralogy, fauna and flora, anthropology, population, and vital statistics, and all that concerns agriculture, commerce, trade, industry, and life, domestic and public; and last but not least a special group telling of the Europeans in the colonies and their relations to the natives, in which the engineer will be much interested in the different systems of portable railways in use, that introduced by Mr. Fowler of this country being admittedly the best; and the still more novel cable railway. Telegraphists will be interested in the sea cable damaged by coral growth, the land cable twisted together by the tusks of rudely inquiring unscientific elephants, and the telegraph poles of living wood (*eriodendron anfractuosum*), the fruit of which, *kapok*, is an article of trade. In another part of the building are samples of 'edible earth.'

The great living curiosities of the exhibition are, however, the Arowakken, who lead a nomadic life in the forests of Guiana, and who have hitherto defied all efforts to civilise them. They live on the grounds in their own cabin as they live in the woods. They believe that animals have a language, and noting that dogs talk face to face, these natives, sharing the Mussulman contempt for dogs, talk back to back. Their only article of dress is fashioned of coral, in form and size of the primitive fig leaf. When a woman bears a child it is the father who takes to the hammock, and, smoking and drinking, receives the lying-in visits, while the mother goes on with the work. They love their intoxicating drink *cassieric*, made by old women spitting chewed *cassave* bread into a carved out trunk of a tree, filled with water and palm seeds, and the whole being allowed to ferment. Bush negroes and numerous half-breeds on exhibition in the grounds help to keep the Arowakken in countenance.

An attempt was made to get together an adequate representation of the Transvaal, which Dutch Republicans have made so difficult for English monarchical government, but the attempt did not succeed; and what is here shown adds nothing to our knowledge of either Boer or Zulu. A Dutch Mormon, named Zeehandelaar, has sent a pretty good collection of Mormon settlement minerals, which were exhibited some time ago at the more neighbouring locality of Denver. Algeria—thanks to the French influence that predominates in the Exhibition—shows some 223 different products of the natural and industrial resources of that French colony. New South Wales, in the more extended geographical acceptation of the name, is mainly represented by Victoria; the gilded pyramid that tells of the precious metal that once drew multitudes to its coasts, and which has done duty at so many exhibitions, proving the most prominent and attractive object. There are small collections from Mauritius and Jamaica, and a still smaller collection from Cuba, of which particulars relating to and products from Nipe form perhaps the more interesting portion. Nipe is being exploited by an agricultural and industrial company which is established in Madrid, has a branch at Paris, and its administration in Cuba. Nipe is described as the most fertile and healthy port of the island; and the company report that, though scarcely two years old, they are doing a good trade in mahogany and cedar wood, tobacco, sugar, and cattle, and have unexpectedly come upon a mine of wealth in the shape of iron ores, said to be almost pure and without phosphorus. The port of Nipe, on a large and safe bay, directly connects Panama and New York, and cannot fail to become an important commercial *entrepôt* when the Panama Canal is cut.

Of independent countries, undoubtedly France, Germany, and Belgium make the largest and the most comprehensive show. The first-named has spared no expense in decoration; and glitter of gold, brilliancy of crystal and porcelain, and luxuriousness of furniture and upholstery eclipse all other nations. But Germany has spared no effort; and the plainer yet more solid forces of commercial enterprise and manufacturing resources she brings to the front, make the characteristics of the two still antagonistic nations as patent on this chosen field of industrial battle as they were so recently on the field of military encounter. Belgium has an eye to customers and has poured in all the good and well-made products especially in iron, machinery, and woollen goods, which she is so formidable a rival to England. Austria Hungary makes but a very small show; and still Russia, Spain, Italy, and Sweden. China has a curio shop on a large scale, with plenty of cool Chinese shopkeepers to sell the curiosities at a large profit to discriminating Europeans. Japan keeps a similar shop and Persia follows in the same line of business; while Dutch makers and shopkeepers make an abundant show Amsterdam having a large pavilion to itself. How England looks I have already told; and British India is chiefly represented by the magnificent loan exhibition of the Prince of Wales.

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more for the taking of money than the imparting of information, are Turkish, Tunis, and Negro bazaars, and Dutch, French, and German refreshment houses, including a German 'Wein-kneipe,' where the inquirer, as he strolls about the grounds, may call and learn much and spend as little as he pleases.

It is time now after this general view to make a round of careful inspection of those exhibits which more particularly interest the readers of the SANITARY RECORD.

It would be surprising at a Dutch exhibition not to find Dutch tiles, but their restoration to the fire-place, be it close stove or open grate, is as much a matter of *renaissance* in Holland as it is in England. In the former country it is simply a revival; there are all the old forms and figures as the old Dutch potters made them generations ago, and had not English pottery been conspicuous by its absence, contrast would have shown what great strides England has made in art and manipulation in relation to this primitive handicraft. Among the noteworthy exhibits at Amsterdam is a fine collection of the reproduction of old Dutch tiles, shown by Ravestein, of Westraven, Utrecht; some of them conjoin to make up large-sized views of scenes in Holland, while pillars of fine old-fashioned tiles for stoves and chimneys are not inartistically built up. The brothers V. D. Heyden, of Rosandaal, exhibit a new departure for Holland in some well-designed and made Portland cement tiles. In sanitary earthenware the best, if not the only exhibit, is that of an English firm, W. Harriman & Co., whose pipes are admirably well-made, and kitchen sinks just what such constructions should be. They also show well-made fire-bricks. The best show of filters, too, is made by the English house of George Cheatens, of Wide Bargole, near Boston, who exhibit their patent filter, which at other exhibitions has been so successful in attracting the favourable notice of judges.

With saving life only a few exhibitors are concerned. Low & Buff, of Dundee, show one of Evans & Lewis's combined signal and line-throwing guns which have proved so serviceable in saving life at sea. Indirectly serving the same object is the exhibit of Chadburn & Son's (Liverpool) patent mechanical engine and steering telegraphs, which have been fitted and done such good service on board of more than 2,500 vessels.

There is little shown that is provised for the sick and invalid. Victor Penzo, of Hatton Garden, sends a well-made and upholstered easy chair which can be unfolded to the full length of a comfortable bed, or in less elongated but more pliant forms as an invalid chair, graduated at will for ease and comfort of back, or legs and feet. Personne, of Brussels, shows a commendable variety of mechanical beds and chairs for invalids, chairs for medical and dental purposes, and chairs on wheels for the transport of sick and invalid persons. All the objects exhibited show more or less skilful ingenuity in design and good taste and finish in aid of substantial work in manufacture. A mechanical appliance for raising a sick person from the bed while the bed is made or the invalid is 'changed' is as simple as it is efficacious; and, being easily moved from bed to bed, is admirably adapted for infirmaries and hospitals.

Machinery is a large show, France and Belgium being by far the principal exhibitors; but there are no boilers on the ground which for excellence and make, security and economy, equal those of W. Galloway, of Manchester. Green, of Manchester, exhibits one of his efficacious fuel economisers in heating the water of large boilers; and Pasquale Alfieri, of Naples, shows a Vegetable Disincrustator for removing and preventing saline and calcareous deposits in steam boilers. It is a powder, a solution of which, poured into the boiler according to rather minute directions, dissolves old and prevents the formation of new incrustations. It seems to be very largely and successfully used in Italy. As a contribution to economy in the transmission of steam, John J. Royle, of Glasgow and Manchester, exhibits his patent Radius Valve, the distinctive features of which are that it acts very effectively without piston, diaphragm, mercury, springs, or India-rubber, that it is correct in action, both on the boiler and on the reduced side, and that it will not stick.

To produce a greater consumption of smoke and a more economical use of fuel in the firing of boilers, Hopewell & Co., of Topsham, Exeter, show their patent fire and bearing bars and Broadbent's patent self-acting smoke preventer. The bars are of simple construction, and will be all the more acceptable to foreign manufacturers from the fact that they are especially adapted to the burning of small coal. Being reversible, one is equal to any other two furnace bars, and they will last twice as long. Broadbent's smoke preventer attains its object by a mechanical method of keeping the furnace door open a sufficient time after each firing to prevent the accumulation of smoke. The self-acting motion is contained in a box, and consists of a train of wheels and pinions, regulated by an escapement. From the box there projects a lever, which is attached, by means of a light chain, to a patent louvre fixed in the ordinary furnace door. Upon opening the door for the purpose of charging or stoking the fire the chain becomes slack, and a balance-weight, descending by its own gravity, raises the lever, the louvre opens on the shutting of the door, and is then gradually closed by the falling of a weight attached to it, and connected by a chain with the self-acting machinery above. The rate at which the louvre closes can be adapted to any quality of coal, and the admission of air made to coincide as nearly as possible with the requirements of perfect combustion. This is a vast improvement, as well in effectiveness as in economy, on the usual plan of leaving the furnace door open.

The best representatives of what I may term domestic machinery are mainly English exhibitors. Thos. Bradford & Co., of Manchester, occupy, as usual, a prominent place in washing, drying, and mangling machinery, their Vowel combination machines being especially commendable. Their Vowel No. 1 combines washing, wringing, and mangling, and is excellently adapted to the work of a small laundry; while the A1, a smaller machine of the same character, will efficiently do the work of any household. A variety of small machines of the same character provide as well for the laundry wants of families of various sizes. The firm also show good specimens of their Improved Premier Box Mangles for steam power and of their Patent 'Glosser' calender or hot cylinder mangle, heated by steam, which dispenses with the use of flannel for covering the bottom roller, and needs no endless band, while it can be easily worked by two young girls. Thomas Taylor & Co., laundry engineers, of Stockport, also make a good show of washing, wringing, and mangling machines, which are as ingenious and effective in their design as they are strong in their construction.

George Salter & Co., of West Bromwich, make a comprehensive show, and is the only exhibit I saw of spring weighing machinery, the exhibit being remarkable for the variety of purposes, domestic and otherwise, to which the principle is applied. The specialities of the firm in bottle-jacks, box smoothing irons, &c., are also commendable. Clark, Bennett & Co. exhibit their secure closing for shops, warehouses, doorways, and every description of opening with their patent steel Revolving Shutters. In strong rooms, iron safes, and unpickable locks there is nothing to be found in the exhibition equal to the displays of Chubb, of London, and Chatwood, of Manchester. The novelty of the former is an improvement on the chronometer lock of the Yankees. It is furnished with two chronometers, so that if one should break down, the other may take up the running. At any time fixed the lock unlocks itself, and a handle alone has to be turned to withdraw the bolts and open the door of the safe. But at any fixed time the lock relocks itself, and the door cannot be opened until the time prescribed on the chronometer dial. Should both chronometers break down, then a small electric apparatus in a box on the top of the safe can be set at work, and after the allotted interval the door will be unlocked and the safe may be opened. The

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novelty of Chatwood's show is a model of a very large strong room, provided with an ingeniously constructed hydraulic lift for raising books out of it in the basement below to the bank manager's room above. The top of this lift when not in use can be as safely closed as the door of the strong room itself; and the door may be left open during the day for ventilation purposes, for the entrance is further guarded by an ornamental but very substantial grill gate.

The English stove-makers make a very small show, the exhibition of new contrivances being confined to the well-known, useful, and effective slow combustion stoves of Barton & Co., of Boston, and those of Musgrave & Co., of Belfast and London. But rather a novelty in Continental exhibitions is an exhibit of foreign makes in open fireplaces, some of them being of very fine makes. In this respect the Dutch are especially conspicuous; and Dejem & Sons, of Nijmegen, make a really magnificent show, not only as regards wealth of material and adornment, but in excellence of construction and fine finish of workmanship. The open stoves are all more or less on English models, many with radiating hearths, with an abundance of steel, sometimes brass, but more often nickel plate; and one fireplace is imposingly flanked on each side by finely-cast metal human figures, almost life size. Nearly every grate is furnished with a cowl fixed to the grate, but easily raised or lowered, which does duty for the 'draw-plate' used in many parts of this country; and if draw-plates are to be used and are useful, then this continental method of attaching them to the grate, and of being able to adjust them to any requirement of 'drawing' the fire, is a great improvement on the separate English draw-plate, which is difficult to find when wanted, and which is impossible to modify in its action. The novelty, however, of the Dejem show is a contrivance by which the grate itself containing the fire can, by simply turning a handle at the side, be projected further into the room when greater heat is required, or retired should the room be too hot. The grate runs easily on the wheel-works supplied for this purpose, and all the mechanism admirably serves the end for which it has been contrived. Among the other Dutch exhibits of open fire-grates those constructed with Dutch tile corners and adornments are numerous; but, as I have already remarked, the tiles are not as a rule so artistic or so graceful as those used by English makers.

Belgium close stove-makers show a few novelties. Louis Breners exhibits a hygienic calorifier, which burns a mixture of gas and air by means of an apparatus that is said to destroy the carbonic acid gas produced by gas combustion. To prevent the escape into the room of any obnoxious vapours the air so heated is made to traverse tubes, the heat of which, imparted from the outside, heats the air as it passes through them into the room, the fire of gas and atmospheric air being completely isolated from the chamber. Another Belgium firm, Meura & Sons, show a multitubular close-heating stove acting by similar means, so far as the heating of the air is concerned, the heating pipes serpentining through the fire, and the air being drawn through the pipes with a rapidity that prevents its being burnt in its passage, while it takes so much heat from the pipes as to prevent their becoming red-hot. In this case the fire is also isolated from the room.

A new warm-water apparatus is shown by J. L. Bacon & Co., of Antwerp. The tubes used are extremely small, and the water is drawn into them through a valve at one end by heat applied to them at the other end, the whole being so arranged that the pressure on the valve is not greater than that which corresponds to the temperature of the tubes, thus preventing the formation of vapour. It is claimed that this system is more easily adapted to old buildings at less expense, is more easily managed, warms more equally, and produces a higher temperature, than any other system.

PRIZE-TAKERS AT THE NATIONAL HEALTH SOCIETY'S EXHIBITION.

CLASS I.—Hamilton & Co., Silver Medal for the Harberton Costume; Mrs. Pfeiffer, Silver Medal for Greek Dress; Mr. J. T. Goodman, Silver Medal for General Excellence of Make and Design; Messrs. Dowie & Marshall, Silver Medal for the Excellence of their Hygienic Boots; Wm. Hall, Silver Medal for the Excellence of his Hygienic Boots; Messrs. T. & H. Steele, Silver Medal for their Hygienic Corsets for Adults, and General Excellence of Make and Design; Mrs. Ann Wise, Silver Medal for her Elastic Chest-Expanding Corset and for her Riding and Nursing Corsets; Hamilton & Co., Bronze Medal for Child's Frock (Old Gold); Rational Dress Society, Bronze Medal, Working Woman's Dress, for Economy and General Suitability; Mrs. Beck, Bronze Medal for the General Excellence of her Exhibit; Rational Dress Society, Bronze Medal for their Designs for Underclothing; Mrs. A. Bauer, Bronze Medal for Superior Workmanship and General Excellence; Mrs. T. Taylor, Bronze Medal for Excellence of Design for Infants' Clothing; Messrs. Morris & Co., Bronze Medal, Dress Silks, for Quality of Manufacture and Design; Mrs. Herringham, Hon. Mention for Excellence of Designs for Infants' Clothing; Liberty & Co., Bronze Medal for Quality of Manufacture and Colour; Waukenphast & Co., Bronze Medal, Boots and Shoes, for General Exhibit; Wentworth & Co., Silver Medal, Life-Saving Garments; Lairitz, Bronze Medal, Pine-Wool Productions; J. Rubley, Hon. Mention, Hygienic Stockings; Messrs. Pocock Brothers, the Five Pounds Prize given by the Rational Dress Society for the Cheapness, Form, and Make of their Boots for Working Women and Children; Messrs. Waterman & Co., Hon. Mention in connection with the above Competition.

CLASS II.—Aylesbury Dairy Company, Silver Medal for Artificial Human Milk; Burroughes, Wellcome & Co., Silver Medal for Capsuled Pills and Wyeth Compressed Tablets; Feltoe & Sons, Silver Medal for Lime Juice; W. Hill & Son, Silver Medal for Whole Meal Preparations, especially Finely Ground Whole Meal; A. & F. Pears, Silver Medal for Soaps; P. and P. W. Squire, Silver Medal for Malt Extracts; the Sanitas Company, Silver Medal for Sanitas Oil and Emulsion; Eugene Rimmel, Silver Medal for General Exhibits; P. A. Maignen, Silver Medal for 'Filtre Rapide'; F. C. Calvert & Co., Silver Medal for Preparations of Sulpho-Carbolates; Aylesbury Dairy Company, Bronze Medal for Koumiss; Burroughes, Wellcome & Co., Bronze Medal for Hazeline and Elixoids; Australian Wine Company, Bronze Medal for Muscat and Sauvignon; J. Edmunds, Bronze Medal for Curry, Custard, &c., Powders; P. & P. W. Squire, Bronze Medal for Respirators of Cheap and Good Construction and Improved Medicine Chests; Jeyes' Sanitary Compounds Company, Bronze Medal for Exhibit of Sanitary Compounds; Mottershead & Co., Hon. Mention for Liquor Pancreaticus and Liquor Pepticus; Allen & Hanburys, Hon. Mention for Tasteless Castor Oil; Burroughes, Wellcome & Co., Hon. Mention for Tincture Press; A. Grant, Hon. Mention for Whole Meal Preparations; J. Wheeler, Hon. Mention for Pixine Preparations; W. K. Stevens, Hon. Mention for Flitwick Water.

CLASS III.—Moule's Patent Earth Closet Company, Silver Medal for their Earth Closet Apparatus; John Bolding & Sons, Bronze Medal for Valve-Closet with Flushing Rim and Supply of Water to Trap of Overflow; John Bolding & Sons, Bronze Medal for Wash-Out Closets; O. D. Ward, Bronze Medal for the Household Hopper Closet; O. D. Ward, Hon. Mention for Bean's Patent Direct-Acting Valveless Waste Preventer; George Jennings, Hon. Mention for 'Tip-Up' 'Lift-Out' Lavatory Basin; George Jennings, Bronze Medal for Housemaid's Slop Sink; George Jennings, Bronze Medal for Automatic Flushing Cistern; George Jennings, Hon. Mention for Patent Ball Trap; Hayward, Tyler, & Co., Bronze Medal

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for Full Flush Valveless Closet; Hayward, Tyler, & Co., Hon. Mention for Shower and Douche Valves; T. D. Bostel, Hon. Mention for Brighton Excelsior Closet; Robert Houghton & Co., Bronze Medal for Improved Gulley, with Movable Side Inlet; Henry Conolly, Bronze Medal for Valve Closet, with Supply of Water to Trap of Overflow; Henry Conolly, Hon. Mention for Bellman's Patent Gulley; Henry Conolly, Hon. Mention for Noiseless Water Waste Preventer; J. Purnell & Son, Bronze Medal for Siphon Water Waste Preventer; J. Purnell & Son, Hon. Mention for Air-tight Manhole Door; A. T. Angell, Hon. Mention for Air-tight Manhole Door; A. T. Angell, Hon. Mention for Lip Siphon Trap; Robert Boyle & Son, Bronze Medal for Air Pump Ventilator; C. Kite & Co., Bronze Medal for Improved Inlet Ventilator; C. Kite & Co., Bronze Medal for Chimney-breast Outlet Ventilator; H. W. Cooper & Co., Hon. Mention for Circular Revolving and Sliding Ventilators in Glass; Hayward Brothers & Eckstein, Silver Medal for Hayward's Patent Semi-Prism Reflecting Lens Pavement Lights; Robert Adams, Bronze Medal for Anti-Accident Reversible Window; Robert Adams, Bronze Medal for Fanlight Opener; G. A. Williams, Bronze Medal for Patent Universal and Invisible Outside Blinds; G. Tidcombe & Son, Hon. Mention for Scraper Mats of Metal for Outside Use; Thomas P. Cook, Bronze Medal for Combination Cinderbin and Sifter; Groom & Co., Hon. Mention for Housemaid's Box with Cinder Sifter; Albissima Paint Company, Bronze Medal for Albissima Non-Poisonous Paint; Jeffry & Co., Silver Medal for Cheap Artistic Wall Papers free from Arsenic; Jeffry & Co., Silver Medal for Wall Papers painted in Oil Colours on Lacquered Gold Ground; Morris & Co., Silver Medal for their exhibit of Washable Printed Cotton and other Cheap and Artistic Fabrics; Woollams & Co., Silver Medal for Wall Papers free from Arsenic; Scott, Cuthbertson, & Co., Bronze Medal for Wall Papers free from Arsenic; Henry Carr, Bronze Medal for Diagrams showing that Wall Papers can be produced with as Good Effect without Arsenical Colours; Howard & Sons, Bronze Medal for Parquet Flooring.

CLASS IV.—Messrs. James Allen & Son, Silver Medal for their Ventilating Croup or Steam Draft Kettle; Mr. Thomas William Stidolph, Bronze Medal for the design of his Elastic Cloth-Sacking Bedstead; Mr. H. J. Dalton, Hon. Mention for his Invalid Bedstead Appliance; Messrs. Chorlton and Dugdale, Silver Medal for their Excelsior Spring Invalid Couch; Messrs. Pocock Brothers, Hon. Mention for their India-rubber Appliances; North of England School Furnishing Company, Bronze Medal for Roth's School Seats; Mr. Hansell, Bronze Medal for his Movable Bed Table and Shelf combined; N. Nixon, Silver Medal for his Bed-Pan Cage, Hon. Mention for his Bed-Rest with Foot Support, Hon. Mention for his Croup Kettle; Messrs. Beynon & Cox, Bronze Medal for their Turkish Bath on Cox's Pure Air Principle; Madame Rubens, Bronze Medal for her Model Urinals for Children and Invalids; Miss McMullin, Bronze Medal for the ingenuity displayed in Adapting Electricity to her Hair Brush.

CLASS V.—Harper Twelvetrees, Silver Medal for General Excellence of his Exhibits, excepting Water Filter; Victoria Stone Co., Bronze Medal for Patent Stone Flooring; Geo. Salter & Co., Bronze Medal for Hughes' Patent Fountain Washer; Messrs. Groom & Co., Hon. Mention for Bower's Patent Potato Steamer.

CLASS VI.—B. Giles & Co., Bronze Medal for Gas Fish and Vegetable Steamers; Bronze Medal for Gas Water Heater; Brown & Co., Bronze Medal for Mitrailleuse Lamp; Brown & Green, Silver Medal for Under-feeding Smoke Consuming Apparatus, as applied to Kitcheners and Register Grate; W. & S. Deards, Bronze Medal for Princess Louise Stove for Heating by Hot-water; The Eagle Range and Foundry Co., Silver Medal for Eagle Range; Potter & Sons, Bronze Medal for Thermhydic Ventilating Hot-water open Fire Grate; T. J. Constantine, Silver Medal for Treasure Cooking Range; Joseph Davis & Co., Hon. Mention for Bath Thermometer; Hon. Mention for Oven Thermometer; James Stott & Co., Silver Medal for Self-acting Gas Governor; O. G. Blunden, Hon. Mention for Red Earthenware Cooking Utensils; Groom & Co., Hon. Mention for Oxford Oil Can; Vertical Feed Sewing Machine Co., Silver Medal for the Vertical Feed Sewing Machine with attachments; Beynon & Cox, Bronze Medal for Workman's Grilling Stove; Beynon & Cox, Silver Medal for 'Saveall' Gas Cooking Stove; Beynon & Cox, Silver Medal for Gas Stove for Heating and Ventilating; W. H. Stephenson, M.D., Bronze Medal for Portable Gas Heating Water Coils; The Silber Light Company, Bronze Medal for Miratus Oil Stove for Cooking and Heating; Bronze Medal for the Wellington Reading Lamp; Hon. Mention for Lamp Filler; H. & C. Davis & Co., Bronze Medal for The Eclipse Griller; The Coalbrookdale Co., Limited, Bronze Medal for Kyrle Grate; Richards & Barton, Hon. Mention for Circular Fronted Range; J. E. H. Andrew & Co., Bronze Medal for Bisschop Gas Engine; B. Giles & Co., Silver Medal for Giles' Gas Cooking Stove; The General Gas Heating and Lighting Apparatus Co., Limited, Silver Medal for their Exhibit of Gas Cooking Stoves, Bronze Medal for their Artisan Gas Griller.

THE SANITARY INSTITUTE.

THE seventh anniversary meeting of the Sanitary Institute of Great Britain was held on the 12th inst. in the theatre of the Royal Institution, Albemarle Street. Professor Humphry, M.D., F.R.S., who presided, after dwelling on the important work of the institution in relation to the moral and physical condition of the people, said the eyes of all Europe were turned with anxiety and apprehension towards Egypt, where the most terrible of all maladies was reaping its daily harvest of victims. The question, then, was what steps ought to be taken to prevent the malady from spreading. The real thing was for every country in Europe, for every town in Europe, and every individual in Europe to take care and set their houses in order. Sufficiency of drainage and ventilation ought to be immediately looked to. It was in its underground drains that London was most defective. Houses with bad drainage were taken, and calamities occurred when it was too late to prevent them. The work of the sanitary institution was to collect and to spread a knowledge of these sanitary arrangements which were requisite for the welfare of the people; to encourage and promote those various machines, arrangements, and inventions which might conduce to a good sanitary condition of the people; and perhaps the most important of all was that of examining and issuing certificates to sanitary inspectors, inspectors of nuisances—those persons who had to ascertain the condition of houses and report upon them. There was, in fact, no part of its work so important as that which tended to insure a better knowledge in those who had to inspect and report upon the sanitary condition of our dwellings.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

BECCLES.—The most important matter connected with the sanitary condition of this borough during 1882 was the adoption of a new code of bye-laws, based upon the model of the Central Board, relating to the construction of new houses and to the prevention of nuisances arising from the keeping of animals. Mr. Crowfoot enumerates the four primary dangers to be avoided in the erection of dwellings, and points out that they have been the cause of frequent attacks of disease—both constitutional and zymotic. The authority have under consideration bye-laws providing for the regular and systematic removal of the contents of earth-closets and privies, but have not yet

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overcome the difficulties which have presented themselves in the way of practically carrying out the requirements of the by-laws. Mr. Crowfoot, however, urges upon them the importance of securing a regular and systematic cleansing of all privies and earth-closets, and points out that in the majority of cases in which the services of the sanitary inspector have been called into requisition, the cause of the nuisance has arisen from neglect in this direction. Special reference is made in the report to the condition of the water used in the dairies in the town, and to the legal proceedings which were taken to secure the supply from contamination. The health officer reminds his authority that they cannot be too active in informing cowkeepers and purveyors of milk of the peculiar risks that may arise from the nature of the article they deal in, and that contamination may lead to very dangerous and extensive mischief. The mortality statistics call for little comment. From all causes the death-rate was as low as 13·8 per 1,000; and, excluding the deaths of persons who come into the district with their fatal illness upon them, this is further reduced to 12·7. Zymotic diseases were fatal in three cases only.

CARLTON URBAN.—Mr. Knight, in his first report on this newly-constituted district, deals decisively with the numerous insanitary conditions which exist therein. He refers especially to the defective water supply and drainage, and to the evils arising from badly contructed premises. Referring generally to the sanitary condition of the place the health officer observes :—'Considering the deplorable state of a large number of occupied premises in the district, we have had a marvellous escape from extensive epidemics.' So far but little progress has been made in improving the evils complained of, but Mr. Knight seems to have convinced the authority of the responsibilty of their position, and prompt action may therefore be looked for. In the first place active steps should be taken for providing the district with a proper supply of water, and for compelling owners to lay it on to inhabited houses where the present supply is unwholesome. The deaths during 1882 numbered 105, representing a death-rate of 18·18 per 1,000. Zymotic diseases were fatal to twenty-one persons, diarrhœa—which prevailed extensively throughout the year—accounting for six deaths. The rate of infantile mortality was excessive, more than half of the total deaths having occurred in children under five years of age. Mr. Knight reminds his authority that while much of this mortality is due to the causes over which they have but little control, the present insanitary condition of the district is an important factor in its causation.

DOVER URBAN.—Dr. Robinson makes a special point in his annual report of the evils arising from the faulty drainage of houses. He refers to a case of continued fever which occurred at a house where an untrapped drain, situated within the premises and communicating directly with the sewer, as also another untrapped drain close to the back door, were both sensibly delivering volumes of sewer gas at the time of his visit. Original faults of construction, the use of cracked or second-rate pipes, faulty workmanship, want of attention in flushing and cleansing, to say nothing of the denudation effected by the chemical action of gases and the work of rats, alike necessitate constant watchfulness and supervision. This attention is, as Dr. Robinson well observes, 'absolutely necessary if the insidious blood poisons which literally steal in darkness on their silent march of death are to be kept from entering houses, as they often do, through waste pipes, from cisterns, baths, lavatories, housemaids' closets, and sinks, many of which, in the older houses, are untrapped or communicate directly with the main sewer.' The death-rate from all causes during 1882 was 16·1 per 1,000, and the rate from the zymotic group of diseases was 1·7. Measles alone accounted for more than 41 per cent. of the total deaths from zymotics. Dr. Robinson gives an interesting account of the spread of the infection of this disease by school attendance. When he first learnt of the outbreak it was confined chiefly to the families of scholars attending one of the elementary schools in the borough. Efforts were made to secure the closure of this school, but without success, and the number of cases traced to connection with the school proved it a fertile source of propagating the disease. During the last ten years not a single death from small-pox has occurred in Dover, although the disease has on many occasions during this period been imported into the town. Dr. Astley's Infectious Hospital is again spoken of in terms of great appreciation of its usefulness.

HOLSWORTHY RURAL.—The mortality statistics recorded in this district during 1882 present some points of interest. Nearly 40 per cent. of the total deaths (151) occurred in persons aged sixty and upwards, and 26 per cent. in infants under twelve months, while 37·7 per cent. were under five years of age. The infantile mortality, measured by the proportion of deaths under one to registered births was about 14·4 per cent., or nearly double that of the previous year. With the exception of an outbreak of measles, zymotic disorders were not present in an epidemic form. At the commencement of the year scarlet fever was known to be lurking in a mild form in and around Holsworthy, but the measures adopted were successful in preventing any spread of the disease. The epidemic of measles referred to is instructive in showing the important part not infrequently played by schools as the media of disseminating infectious disease. Mr. Ash clearly proves that by the attendance of a boy suffering from measles the whole community of scholars were infected, and the disease spread broadcast throughout the district. Fortunately the epidemic was of a mild form, and but one case proved fatal. The authority of this district do not appear to have yet fully comprehended the important duties imposed upon them by the Public Health Acts. The sewage outfalls still remain in an unfinished state, and privy nuisances abound everywhere. Some good work was done in improving the water supply, but much yet remains to be accomplished. The district remains unprovided with any means of isolating cases of infectious disease, or of effectually disinfecting clothing, and Mr. Ash again urges the importance of their immediate provision.

NEWINGTON.—The overcrowded state of this district is an evil which calls for serious reflection. Newington is contained in a compact area of 624 acres, the density of the population per acre being 172 persons, while that for London is 49. This large number of persons to an acre means, as Dr. Iliff points out, 'defects and defaults in sanitary arrangements, hidden, because too often their exposure must lead to a new home being sought, and with what difficulty found those only who are practically acquainted with the sorrows and struggles of the deserving poor, can fully appreciate. The world, too, often stands aghast with some harrowing tale of overcrowding, and cries shame on those who allow it, but they little think of the impossibility of preventing it; artisans must live near their work, rents are high, and their legitimate wants are many.' Dr. Iliff quotes a distressing instance of overcrowding, which he discovered on inspection. A not over large house was occupied by 28 persons, men, women, and children. There was only one closet, and the water supply was insufficient. Six occupied one room, viz. : husband, wife, and four children. In two instances five each occupied one room—husband, wife, and three children; four occupied one room; and the remaining eight had two rooms between them. Another type of overcrowding, that at night, is more difficult to deal with and far worse in its results, both moral and physical, because here adults have to be dealt with, or those, at all events, verging on riper years; and men and women, who are occupied in various ways during the day, return at night to rest in the most objectionable fellowship. The latter evil is indeed one of the gravest import, and one which we are glad to see has arrested the attention of the Charity Organisation Society. The condition of the water supplied

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to the district, a favourite theme with Dr. Iliff, is referred to at some length, comment being made on the confusing rates of calculation adopted by the principal analysts. A large number of houses were inspected during the year on account of default in sanitary arrangements, and numerous improvements were effected. Dr. Iliff does not enter into the details of nuisance removal, but he notes with gratification that as years roll on there is less difficulty in enforcing sanitary orders, the feeling being more and more prevalent that there is real cause for them whenever they are made. Owing to the delay in the appearance of the report, the mortality statistics have lost much of their interest. From all causes the death-rate during 1881 was 22·6 per 1,000 of population. There was an increase in the fatality from small-pox, which was prevalent during the first six months of 1881, and from measles, but the deaths from scarlet fever, whooping-cough, and diarrhœa, show a decline. Dr. Iliff is unfortunate in his report appearing as an annex to certainly the most extraordinary effusion from the pen of a vestry clerk that it was ever our lot to read.

River Tyne Port.—This district has at last been put upon a proper footing by an order of the Local Government Board, establishing it on a permanent basis. There is little doubt that port districts exercise a most important influence, not only in preventing the introduction of infectious disease into this country, but in securing the carrying out of improvements in ships which would otherwise escape detection. During 1882 the number of vessels inspected in the Tyne was 6,623, against 3,309 in 1881 and 2,997 in the previous year. In 506 cases the vessels were found in a defective condition, and notices were issued for their amendment. With the exception of eight ships, these alterations were carried out satisfactorily. In 31 instances structural improvements of importance were carried out. The water supplied to vessels was examined on numerous occasions, but in no case was any cause for complaint observed. Mr. Armstrong reports that ten cases only of infectious disease were treated in the hospital, although a sharp look-out was kept for all cases of small-pox that might have been imported into the district from infected places. The prevalence of cholera abroad and the possibility of its being brought thence to the Tyne, led to especial vigilance being directed to all vessels arriving from suspected countries. No case of cholera was, however, discovered.

Wellington (Somerset).—Dr. Meredith is evidently practically acquainted with the defects and the needs of the district under his charge. He gives a variety of detailed advice as to the sanitary appliances to be used in particular cases, and is especially eloquent in denunciation of D traps and containers. As far as the public health is concerned, Dr. Meredith has an exceptional state of things to report. With the exception of a few deaths from typhoid and diphtheria, zymotic disease was totally absent from the district, and the death-rate, 14·0 per 1,000, is the lowest on record. This satisfactory result is in no small measure due to the energy displayed by the health officer, and to his influence in securing the necessary improvements.

SANITARY INSPECTORS' REPORTS.

Aston Rural.—The report submitted by Mr. Deeks contains a large amount of carefully tabulated information relating to his work during the past year, but the present statistical form is not one that can be commended, since it leaves no room for comment or remark by the inspector. The excellent arrangement of examining all plans of houses, &c., previous to their erection is adopted in this district, and the report contains details of the work of the sanitary committee in this respect. The water supply [illegible] in an unsatisfactory condition, since of 71 samples submitted for analysis, no fewer than 63 were condemned unfit for drinking. Doubtless this accounts for the supplying of 94 houses with tap water.

Bath Urban.—It is not quite clear why Mr. Montague's report has not been published in a complete form. An extract only has been presented, and that in conjunction with the report of the medical officer of health. The fault, however, does not seem to be with Mr. Montague, who states that, during 1882, as many as 144 premises were disinfected after infectious disease. Thirteen cases of overcrowding were disposed of, and two houses were closed as unfit for human habitation. Ten smoke nuisances were abated, 146 offensive accumulations were removed, and 15 supplies of pure water provided. No fewer than 306 premises were cleansed and whitewashed after notice. The usual inspections of the slaughter-houses, common lodging houses, &c., appear to have been duly made.

Bury.—In addition to giving an account of his work during the year, Mr. Wilkinson enters into the question of cost, in regard to which the report contains some interesting details. There was a saving of 120*l.* in the cost of night soil removed during the past year over the previous one, which has been due to collecting the ashes and rubbish from the pail closets during the day instead of at night. This affords, Mr. Wilkinson thinks, a strong argument in favour of the universal adoption of the Hyde system at Bury, as the whole of the necessary work would then be done in the day time. On the old system each privy cost 6*s.* 7½*d.*, and each pail privy 8*s.* 1*d.* for the year. As many as 159 slopstone pipes were disconnected from the drains, while 411 yards of new tile pipes were laid in place of old stone and brick drains, and 243 earthenware traps were fixed. Notices were issued for the abatement of 248 nuisances, and 190 privies and 103 ash-pits were reconstructed during the year. The inspector also gives an account of the work of disinfection carried on throughout the district, and of the operations of the mortar mill. The report, which is printed in a separate form, is, upon the whole, very satisfactory, and indicates that Mr. Wilkinson has discharged his arduous duties with zeal and ability. The amended death-rates for the last six years, as re-calculated by the inspector, are as follow:—1876, 26·08 per 1·000; 1877, 27·28; 1878, 32·29; 1879, 23·73; 1880, 23·0; 1881, 21·15 We trust that 1882 will show an even greater diminution.

Handsworth (near Birmingham) Urban.—Mr. Loach's report is occupied in recording the number and description of nuisances abated during 1882, and there is little, if any, account of the completion of structural improvements. The inspector reports, however, that 92 houses were provided with corporation water, and that 3,669 ash-pits were emptied. Some 320 notices were issued for the abatement of nuisances, 49 being to cleanse and disinfect houses, 34 to connect drains with the main sewer, nine to close wells, and four to provide a proper supply of water. Mr. Loach states that 304 notices were complied with; but he does not specify the particular class of nuisance abated, and, indeed, in most respects, the report is by no means too full.

Hastings.—The particulars given by Mr. Inskipp of his action in this important health-resort, show evidence of good work, but his report would bear expansion. In connection with the prevalence of infectious disease, 96 houses were fumigated and 111 sets of bedding and clothes were disinfected. Six smoke nuisances were abated, 56 drains were cleansed, and obstructions in them removed, and three cesspools were filled up. In five houses overcrowding was abated, and in 15 the ventilation was improved. The removal of refuse received attention, as did also the keeping of animals.

Hereford Urban.—The prevalence of scarlet fever in this district claimed no inconsiderable portion of the time of the inspector, who was unable in consequence to complete a house-to-house survey. Special attention appears to have been directed to the registration and inspection of milk-shops in the borough, and having regard to the facilities offered by these places for the dissemination of infectious disease, the importance of this step cannot be

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over-rated. During 1881 Mr. Bridgewater reports that 394 nuisances came under notice, of which 146 were from defective water-closets, privies, and drains, but he gives no details as to their abatement. The inspector proposes shortly to bring before the notice of his authority several cases of inadequate privy-accommodation, and his report for the present year will doubtless give an account of his work in this direction, and of any other improvements that may be effected.

HOVE.—Mr. King's report is too general in character. It does not contain in sufficient detail an account of his work or of the nature of the nuisances abated. The inspector states that during 1882 1,718 houses were visited, and that 692 complaints were received. In 524 cases notices were issued for the removal of nuisances, and for the provision of a permanent water supply to privies; 722 works were executed, the cause of complaint being removed in each case. An immense number of visits were paid to bakehouses, slaughter-houses, milk shops, &c., but the report does not contain any mention of the conditions discovered on inspection. Legal proceedings were taken against 28 persons for various offences.

LEDBURY RURAL.—Although only a summary of nuisances removed and of a few improvements effected during 1882, the report shows that the inspector has been fairly active in his district. Mr. Dingley states that fifty sets of drains were either provided or repaired, that six earth closets were erected, and that nineteen houses were disinfected. A considerable number of cesspools were cleansed, repaired, and bricked, nineteen pigsties were removed, and other miscellaneous nuisances arising from accumulations of refuse disposed of. Overcrowding seems to prevail, since eight cases were abated during the year. Twenty-seven samples of water were collected from different parishes and submitted for analysis. Six of these proved to be totally unfit for dietetic purposes. The authority will doubtless see that the proposed house-to-house survey is carried out throughout their district, which will afford Mr. Dingley the opportunity of preparing a fuller report for the present year.

LUTON URBAN.—The sanitary work accomplished in this borough during the past year was of an important character. As many as 70 defective privies were converted into closets, 23 sinks and drains were repaired, and a proper supply of water provided in 8 cases. Mr. Jerrard reports that 21 closets were 'rectified'—whatever that may mean. Systematic inspections appear to have been made throughout the district, as is evidenced by the fact that while in 1881 the number of nuisances dealt with was only 110, the number disposed of during the past year amounted to 229.

MANOR OF ASTON URBAN.—Mr. Bolt has been at some pains to make his report on this district a complete record of his work, and his method of reporting is commendable. Thus he not only indicates the improvements effected during the past year, but shows in a concise form how the nuisances standing over from 1881 have been dealt with. The report also contains an account of Mr. Bolt's work under the Food and Drugs Act, and it speaks well for the energy displayed by the inspector that fines amounting to 43*l.* 19*s.* 6*d.* were imposed for selling adulterated articles. There seems to have been a considerable prevalence of infectious disease in the district, since no fewer than 638 cases were visited by the inspector, who fumigated 156 houses and disinfected 155 lots of bedding, &c. The slaughter-houses were subjected to systematic inspection, 2,581 visits having at different times been paid to them. One hundred and five observations were taken of factory furnaces, and 17 notices were served for the abatement of smoke nuisances, all of which were complied with.

NEWCASTLE-ON-TYNE.—The sanitary inspector's summary of work performed in this borough shows that a nuisance removal has been promptly attended to, and that many minor improvements have been effected. No fewer than 249 rooms were closed as unfit for human habitation, while in 28 cases overcrowding was discovered. Mr. Curry reports that in 139 instances the water supply has been improved, that 818 defective drains and gutters have been repaired and cleansed, and that 634 dilapidated privies and ashpits have been put in a proper condition.

SALTLEY URBAN.—Mr. Payne opens his report with a statement of the number of notices issued during 1882, of the number of magisterial proceedings, and of the number of convictions. He then gives an account of his work—of the improvements effected and of the nuisances abated. He reports that 43 houses were supplied with water from a public source, that 26 house-drains were cleansed and repaired, and that 70 were connected with the sewers; that 18 privies were repaired, and that 16 building plans were approved. Twelve samples of water were submitted for analysis, ten of which were found to be largely contaminated with sewage matter, and totally unfit for use, while the other two samples were pronounced to be suspicious. The polluted wells were immediately closed and tap water supplied.

SAMFORD RURAL.—During 1882 Mr. Kerridge inspected 1,472 houses and premises, more than half the whole number in the district. The immense value of house-to-house inspections is here clearly set out, for while only 16 complaints were made during the year, a considerable number of nuisances were discovered in the course of the inquiry, which also led to improvement being effected in the condition of no fewer than 52 houses. It is, indeed, only by such systematic visitation that an inspector can become practically acquainted with the existing state of his district and of the conditions calling for attention.

SOWERBY BRIDGE.—During 1882 a number of cases of diphtheria and enteric fever occurred in this district, which seem to have been undoubtedly due to existing insanitary conditions. The drainage arrangements appear to be unsatisfactory in many places, a large number of sink-pipes being found untrapped. Improvement, however, is being made in this direction, and Mr. Whitlaw, the sanitary inspector, reports that during the past year 22 houses were provided with efficient traps. There seems need for special vigilance as regards the common lodging-houses, since there is a tendency to overcrowding.

ST. ALBAN'S RURAL.—Some useful work was completed in this district during 1882, but Mr. Comley's report suffers from its statistical form of arrangement. The inspector gives details of the number of privies and cesspools repaired and cleansed, of the removal of refuse, and of the performance of other routine work. Water was supplied to nine cottages, and in three overcrowding was abated, while 60 were disinfected and otherwise cleansed. An inspection was made of the slaughter-houses and bakehouses, many of which were limewashed, &c. The total number of nuisances and other minor matters dealt with by the inspector during the year amounted to 1,025.

STOCKPORT RURAL.—Mr. Sykes, the sanitary inspector of the Hazel Grove division of this union, has a very satisfactory account to give of his work during the past year. Nuisances appear to have been expeditiously disposed of, and many minor improvements have been effected. Five houses have been connected with the sewers, a number of house-drains have been trapped, repaired, and cleansed, and 36 slopstone waste-pipes have been disconnected. A large number of miscellaneous nuisances arising from overcrowding, accumulations of refuse, defective cesspools, &c., have been abated, and the routine work of the inspector satisfactorily carried on.

STRETFORD.—During 1882 no fewer than 6,268 nuisances were dealt with in this district, being an increase of 494 on the number reported in the previous year. A large number of defective cellars, passages, ashpits, and yard drains were improved, and 21 bath-pipe connections were made. In 68 cases the condition of privies and water-closets called for amendment, and 9 from noxious vapours; and in 38 houses the slopstone pipes were con-

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nected with the drains. The number of ashpits emptied amounted to 7,157, being an increase of 546 on the number emptied in 1881. Mr. Hill also gives an account of his work as regards disinfection, and the collection of samples under the Food and Drugs Act.

STROUD RURAL.—But few works of importance were carried out in this district during 1882, but the various matters coming under the cognisance of the sanitary inspectors appear to have been satisfactorily disposed of. In the first division Mr. Bailey reports that 26 defective drains have been repaired, that 21 closets have been improved, and that 163 nuisances out of a total of 166 have been abated. The whole of the division has been visited at different periods of the year. In the second division 172 nuisances came under notice, 166 of which have been abated, leaving six to be dealt with at the close of the year. Of his other work in the district Mr. Blackwell gives but few details, but he adds that the bakehouses and dairies were found in a satisfactory condition.

STROUD URBAN.—This district is provided with an excellent supply of good water, but there is some difficulty in inducing the inhabitants to avail themselves of it. In one village where the supply pipes have been laid, but little advantage has resulted, as the people seem to have a peculiar prejudice against this method of supplying water. Mr. Kirby notes, however, that an improved supply has been made in 52 cases, and, doubtless, in his next report he will have to chronicle a further extension. In 9 cases of nuisance legal proceedings had to be taken out, with what result the inspector does not mention. Twenty-three closets were improved, and one case of overcrowding was disposed of. Mr. Kirby adds that he made periodical inspections of all slaughter-houses, lodging-houses, and sewerage works throughout the district, and that he notified any deficiency he discovered. Details of these inspections might well have appeared in his present report.

TODMORDEN URBAN.—In submitting his last report Mr. Blackburn congratulates his authority upon the satisfactory condition of their district, but he reminds them that several isolated cases of typhoid fever occurred during the year, which seem to have arisen from a temporarily polluted water supply. During 1882 some progress was made in sanitary work, the most important improvements noted being the trapping of 78 house-drains and traps, and the draining and repairing of four streets. As many as 20,060 privies were emptied, and a considerable number were built and repaired.

TORQUAY.—The immense importance attaching to a thorough and systematic inspection of health resorts is beyond question; and Mr. MacMahon, in his last report on Torquay, shows that the sanitary condition of that town has been kept under close scrutiny. In addition to the performance of the ordinary routine work attaching to his office, the inspector reports that many improvements of a permanent character have been effected. During 1882 some 113 soil-pipes and house drains were ventilated, 10 new supplies of drinking water were provided, 69 scullery, pantry, or other waste-pipes were disconnected from the drains, and 71 new masons' or other traps were fixed. Two portions of the district where insanitary conditions were suspected to exist were thoroughly inspected from house to house, and detailed reports were made by Mr. MacMahon to the authority thereon. Altogether a total of 608 sanitary improvements in 335 separate premises were carried out during the year. As a further evidence of the amount of sanitary work performed in the town during the past five years, the inspector appends a special report, indicating what progress has been made during that period. The principal items chronicled by Mr. MacMahon are the laying of 171 new sets of house drains, the fixing of 686 ventilators to soil-pipes and drains, the provision of 242 new traps, and the fixing of 566 water-closets. During this period 497 preliminary notices were served, but in seven cases only was it necessary to resort to legal proceedings.

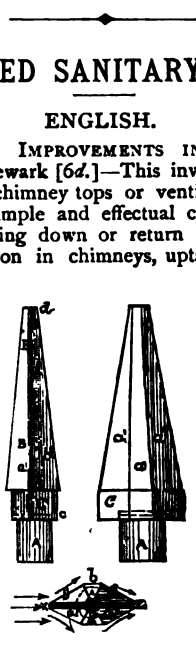
WALKER-ON-TYNE.—The very unsatisfactory condition of the backyards and ashpits of houses situated in this district is a matter which calls for the serious attention of the sanitary authority. During 1882 there were 116 notices issued to clean back yards, 49 to remove ashes, 48 to remove slops on front and back streets, and 44 to dispose of 'general filth.' Mr. Myers also reports that a large number of notices were issued to cleanse and repair ashpits and privies, and to abate nuisances arising from the keeping of animals. The report does not show how many of these were complied with, nor does it give any details as to the improvements affected. In subsequent reports these omissions should be rectified.

WEOBLEY RURAL.—The work performed by the sanitary inspectors, Messrs. Lloyd and Vaughan, during 1882, appears to have been chiefly of a routine character. The extensive prevalence of scarlet fever in the district occasioned considerable trouble, and a large number of houses were disinfected. In the Weobley district 77 nuisances of a miscellaneous character were abated, 3 cottages were provided with privies, and 4 cases of overcrowding were abated. At Dilwyn 29 drains were provided and repaired, 11 pigsties were removed, and 16 privies were improved. In preparing future reports, Messrs. Lloyd and Vaughan will obtain considerable assistance from the tables published by the Society of Medical Officers of Health.

ILLUSTRATED SANITARY PATENTS.

ENGLISH.

3416. (1882.) IMPROVEMENTS IN VENTILATORS: T. J. BAKER, Newark [6*d*.]—This invention, relating to improvements in chimney tops or ventilators, has for its object the more simple and effectual construction of the same for preventing down or return currents of air or retarded ventilation in chimneys, uptake shafts or the like.



Figures 1, 2 and 3 of the accompanying drawings represent a side and front elevation and plan respectively of a chimney top or ventilator constructed and arranged according to the essential features of this invention.

The ventilator is constructed of a very simple and efficient character, presenting every facility for the rapid discharge and egress of smoke or noxious gases, whilst at the same time preventing any return currents or the objectionable ingress of external air currents, for owing to the narrowness of the discharging slits or openings B, provided in the top or ventilator, and the peculiar sloping or angular tapering construction and relation of the head plates *a* and *b*, the external air currents are retarded and deflected (no matter in what direction they may impinge) so as to in no way interfere with the efficiency of the

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draught or ventilation of the chimney or shaft to which it may be applied.

3511. (1882.) FLUSH CISTERNS: W. WRIGHT, Plymouth [6*d.*]—This is an improvement claimed in regard to flushing cisterns.

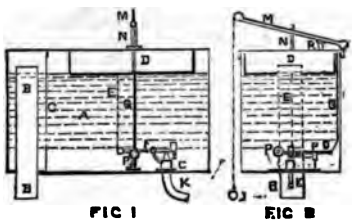
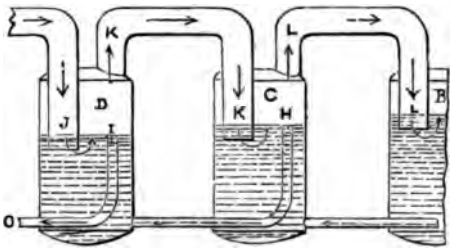


FIG 1 FIG 2

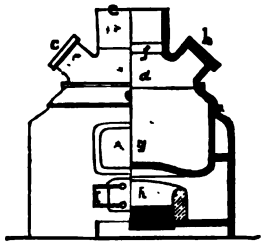
In the accompanying drawings Fig. 1 is a vertical longitudinal section, and Fig. 2 is a vertical cross section of the flush cistern complete, the float being shown in dotted lines; and Fig. 4 is an elevation of the ball cock removed from the cistern and which may be used independently thereof. A is the tank or cistern, B the syphon discharge tube and C the cover, D the float connected by chain rod or other suitable form of connection E to the valve lever F. G is the inlet valve, and consists of the discharge nozzle H, perforated casing G and plug or valve I (Fig. 4); K is the inlet pipe. The action is as follows; water enters by the valve G through its perforations—or in place of the casing or in addition to it a deflector may be used—and as it rises in the tank it lifts the float D which closes the valve and shuts off the supply. To start the flush the handle L is pulled, drawing down the lever M, which by the rod N forces the float D down into the cistern, thereby displacing a large body of water and raising the level of the water in the cistern till it overflows down the inner tube B of the syphon and starts it, and the cistern will then empty itself to the bottom of the tube C. R is a rubber ring to keep lever M raised up. A balance weight on an extended end of lever M beyond the pivot would have the same effect.

3562. (1882). TREATING SEWAGE: J. YOUNG, of Kelly, Renfrew, N.B. [6*d.*]—This invention, which relates to improvements in the treatment of sewage, has for its object to obtain ammonia and other products therefrom, and to render the residue less offensive.



The apparatus employed for the purpose of separating and collecting the ammonia may be arranged in various forms, having for their object the complete exhaustion of the sewage of, and the saturation of, the steam with ammonia, but he prefers to carry out the operation in one of the methods described in the provisional specification lodged by him on Jan. 26, A.D. 1883, together with his application for letters patent of that date. These methods may be described as follows:—He arranges a number of closed vessels in continuity or circular series and passes the steam through each of them in succession until it has completed the circuit. The steam in bubbling through the liquid becomes more or less saturated with ammonia, when it may be either condensed *per se* or passed into acid to extract the ammonia. When the vessel into which the steam first enters is sufficiently exhausted, it is emptied, refilled with fresh sewage, and made the last of the series, while the vessel which was second before becomes the first. This arrangement insures that the freshest steam comes into contact with the weakest liquid, and the most highly-charged steam passes through the strongest liquid, so fulfilling the most favourable conditions for exhaustion of the sewage and saturation of the steam.

3863. (1882). DEODORISING, ETC., HUMAN EXCRETA FOR MANURIAL PURPOSES: R. NICHOLS, Hendon, Middlesex.—This invention is designed to enable the inhabitants of dwelling-houses to deodorise and purify their own sewage or fæcal matter almost immediately after the passage of the same from the body, and afterwards to convert same into a manure rich in fertilising properties. In carrying his invention into practical effect he constructs an apparatus as represented in the annexed drawing in two (preferably) or more parts as follows. The drawing shows partly an elevation and partly a section of the apparatus.



Upon an individual using a water-closet the matter contained therein is conveyed by the above-mentioned tube into the receptacle or receiver, and by means of the tube or aperture on the opposite side thereof the deposited matter is covered over with cinders or ashes preferably, but other materials may be employed for the purpose, such as burnt ballast, lime slaked or otherwise, dry earth, vegetable or animal carbon, sand, crushed granite dust, carbolic acid, or any other earthy substance or chemical deemed necessary. The matter is allowed to collect in this manner until the receiver is approaching fulness or it is desired to obtain manure therefrom. The tube leading from the water-closet to the receptacle is then disconnected from the water-closet by any suitable means, and a screw-cap or other appliance is placed on the end of the pipe connected with the lid of the apparatus, so as to prevent any escape of the vapour during evaporation.

For this purpose a fire is lighted in the furnace, and the contents of the receiver heated until by evaporation of moisture therefrom it is rendered sufficiently dry to be perfectly inodorous. The vapour driven off passes up through the soot or other material contained in the cylindrical casing above mentioned, and is thereby deodorised, and the ammoniacal or other salts contained in the matter under treatment congregate in a crystallised form on the internal surface of the lid. These salts may be removed and advantageously utilised for various purposes. The fæcal matter having been thus subjected to heat in a closed vessel is completely dried, the top part or lid of the apparatus is then removed, and the vessel will be found to contain a perfectly inodorous mixture, highly purified and extremely rich in fertilising properties, and of the utmost value as a manure.

The apparatus is then fitted together, and is again ready for the purpose of purifying the sewage matter of a household or other place.

AMERICAN.

265,600. SEDIMENT TRAP: LORING P. HAWES, New York, N. Y. Issued Oct. 10, 1882.

Claim.—In a sediment trap for pipes, the combination of a pipe coupling and a sediment chamber, provided with a discharging outlet, controlled by a valve or plug, with a transverse bar extending across the lower portion of the

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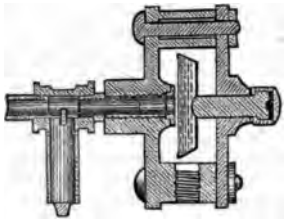
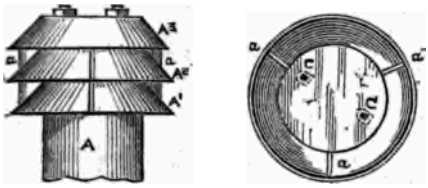
direct passage through the pipe coupling, and adapted for the passage of a diminished current under the bar and



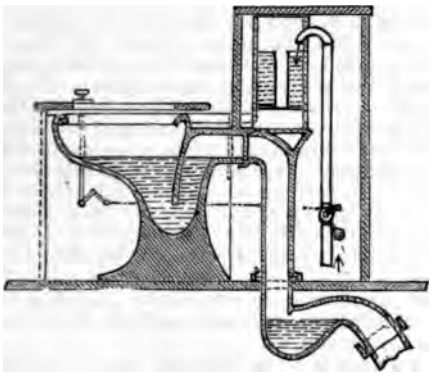
across the upper end of the sediment chamber, as described.

265,814. VENTILATOR OR CHIMNEY-CAP. JOHN H. IRWIN, Morton, Pa. Filed April 24, 1882. Issued Oct. 10, 1882. (No Model.)



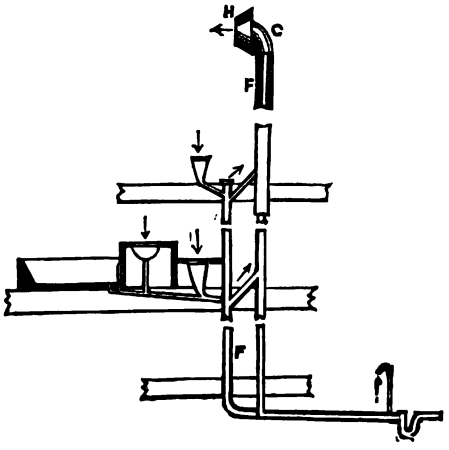
Claim.—1. A ventilator or chimney-cap formed of cast-metal plates, as set forth, bearing wings or arms upon their upper surfaces, the upper edges whereof adapted and arranged to fit within grooves formed in the upper side of the plate above, said plates being held in place and secured to a section of pipe or the chimney-top. 2. In a ventilator or chimney-cap, pipe A, wherein are located eyes B, said pipe bearing annular pipe A^1, having wings or arms *a*, plate A^2, having grooves therein or projecting studs thereon, as specified, and being provided with wings or arms *a*, plate A^2, and bolts or screws C, the whole combined and arranged, as shown. 3. In a ventilator or chimney-cap, pipe A, whereon is formed a rib, D, extending thereabove and from side to side.

266,404. WATER-CLOSET AND URINAL: GEO. E. WARING, JUN., Newport, R.I., Assignor to the Drainage Construction Company, Boston, Mass. Issued Oct. 24, 1882.



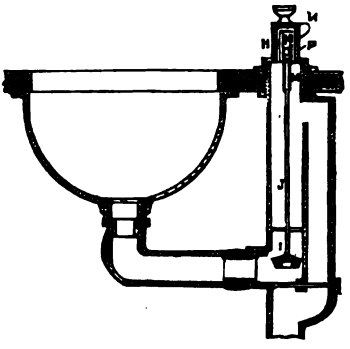
Claim.—1. A water-closet or urinal of which the contents are discharged by the action of a valveless siphon having a depth of seal or dip greater than the greatest diameter of the siphon. 2. In combination with the bowl of a water-closet or urinal whose contents are discharged by the action of a valveless siphon, a siphon which is of uniform diameter throughout its length. 3. In combination with the bowl of a water-closet or urinal, a discharging siphon the mouth of whose discharging limb delivers to the weir chamber or a false trap or other form of obstruction so constructed that when the outflow of the siphon is greater than the capacity of the free space between the mouth of the siphon and the bottom of the overflow of the weir chamber or false trap, or between the mouth of the siphon and the obstruction, the mouth of the siphon becomes sealed or closed against the admission of air. 4. In combination with the bowl of a water-closet or urinal and a siphon by which the same is discharged, a weir chamber or false trap so constructed that the water discharged into it wells up, so as to seal or close the mouth of the outlet at the beginning of the flow, and from which a portion of the water remaining at the end of the flow is discharged, so as to unseal or open the mouth of the outlet. 5. In combination with the bowl of a water-closet or urinal and a siphon for discharging its contents, a weir chamber or false trap or other obstruction so constructed that the mouth of the siphon is sealed at the beginning of the flow and is unsealed after the flow ceases. 6. A water-closet or urinal of which the contents are discharged by the action of a valveless siphon so constructed that the mouth of the receiving limb of the siphon is not opened for the admission of air until after the water in the bowl is lowered to less than one-half its normal depth.

266,433. VENTILATING PIPE AND COWL: JOHN COOPER, Boston, Mass. Issued Oct. 24, 1882.



Claim.—A ventilating pipe, F, increasing in size toward the top, in combination with the cowl G, of greater diameter than the pipe F, and having the base plate *a* and the guard H, substantially as described.

267,156. OVERFLOW VALVE FOR WASH-BASINS: WILLIAM S. COOPER, Philadelphia, Pa. Issued Nov. 7, 1882.



Claim.—The combination of the overflow-chest, the valve I, and valve-spindle J, with rack K, the cap H, the pinion P, the spindle M, and handle N, adapted to hold the valve-rod in either of its extreme positions, as set forth.

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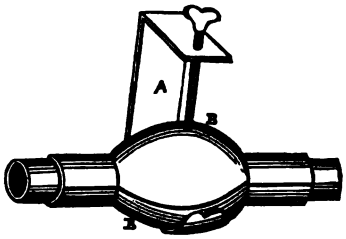
267,800. JOINT WIPER: ROBERT REACH, Washington, D.C. Issued Nov. 21, 1882.

Brief.—Scrape the ends of the pipe. Apply the forms of solder and sections *b* and clamp them in place. Heat and slightly rotate the clamp to melt and spread the solder.



Claim.—The combination of the sections B B, for reception of solder forms and clamp A, substantially as shown and for the purpose described.

REVIEWS.

The Local Loans of England and Wales: Being an Exposition of the Law relating to the Borrowing of Money by Local Authorities, together with other Practical Information with respect to Local Authorities. London: Knight & Co., 90 Fleet Street. 1883. Pp. 438.

THE success with which the Corporation Stocks recently floated have been taken up by the money market, has led to quite a flutter of anxiety amongst municipalities generally to get powers for the conversion of their own mortgages and loans into a consolidated stock, charged indifferently upon the whole of their assets and property instead of upon some particular portion of them. The first authority to create a local stock of its own was the Metropolitan Board of Works, which was authorised by an Act of Parliament passed in 1869, to raise the money it required for various improvements by means of a consolidated stock. This example was followed in 1872 by Manchester; in 1880 by Birmingham, Liverpool, and Nottingham; in 1881 by Birkenhead, Hull, Reading, Stalybridge, Swansea, and the county justices of Lancaster; and in 1882 by Blackburn, Bolton, Derby, Halifax, Huddersfield, Macclesfield, Newcastle-upon-Tyne, Rotherham, Tynemouth, Wolverhampton, and the county justices of Essex. Various other authorities promoting bills in parliament this session ask for similar powers, and Corporation Stocks may therefore be looked upon as the municipal security of the future.

This being so, it becomes of moment to the officials of local authorities charged with the administration of their finances to learn what are the general laws which govern local loans, and the requirements of Parliament with respect to analogous provisions in local acts or Provisional Orders.

The law relating to local loans is in a particularly unsatisfactory and confused condition, and it needed an expert fully cognisant of all its intricacies to guide the way through the maze of legal difficulties with which the subject is now surrounded. Mr. C. N. Dalton, until lately inspector of local loans and local Acts under the Local Government Board, and now one of the Board's assistant secretaries, deserves therefore very general thanks for giving to the world his unequalled store of knowledge on this particular question. The name of Mr. Dalton does not indeed appear on the title-page of the book just issued, official susceptibilities forbidding any such publication. But it is an open secret that he is the author of the work, and indeed no one else could have written it.

The subject of municipal indebtedness is one of many ramifications and considerable difficulty. The recent rapid extension of local loans is in itself worthy of very grave and sustained consideration. These loans have been practically doubled in amount in the course of the last ten years, and now reach the enormous total of something like 160,000,000*l.* To exhaust the subject would require a much larger volume than the one before us. Mr. Dalton has therefore steered clear of any polemical discussions, and has confined himself strictly to the exposition of the law relating to the borrowing of money by local authorities (already indicated as a sufficiently difficult task), and to giving such practical information as is likely to be of assistance to local authorities and their officers in connection with their loan transactions, as well as to persons proposing to advance money on local securities. The heterogeneous statutory provisions regulating local powers of borrowing which are contained in general Acts of Parliament are for the first time brought together and arranged, and some account is given of the practice adopted by Parliament in authorising the raising of local loans under analogous provisions in local Acts and provisional orders. The decisions of the superior courts bearing on the law of local loans are also, for the first time, collected and commented on. So far as local authorities are concerned, some of these decisions afford matter for useful reflection, showing, as they do, what serious personal liabilities may be incurred by the individual members, where money is borrowed otherwise than in accordance with the law, or when it is in any way irregularly dealt with.

The duties of local authorities with respect to the gradual liquidation of their loans involve questions of great importance and complexity. Accordingly every method of repayment which has been recognised by existing Acts of Parliament is discussed and described in the book, and the advantages and disadvantages of each system are pointed out. Elaborate actuarial tables are given for the purpose of enabling local authorities to calculate the amounts of the annual and half-yearly repayments of their loans where the annuity principle is adopted, and also the amounts of the annual payments which are required to be made into sinking funds and loan funds, where the loans are not being repaid by means of instalments or annual appropriations.

The rules and conditions affecting advances to local authorities by the Public Works Loan Commissioners are also set out in full, and a praiseworthy attempt is made to interpret that curiously defective and obscure measure, the Local Loans Act of 1875. Much space is devoted to a discussion and explanation of the circumstances affecting the issue, security, and redemption of the new local stocks which are coming in vogue, and all other information likely to concern either lender and borrower is added. To treasurers and accountants of local authorities, to financiers, stockbrokers, investors, and, indeed, to all who are in any way concerned in local loans and stocks this very complete and carefully compiled volume cannot fail to be useful, and must be well-nigh indispensable.

Bulletin Astronomique de Météorologique de l'Observatoire Impérial de Rio de Janeiro. January and February, 1883.

WE propose briefly noticing the meteorological observations taken at Rio de Janeiro and Rio Grande de Sul. In January 1883, at the former place, the mean of all the thermometric observations taken at four in the morning was 73·1° F.; at 10 A.M., 79·2°; at 1 P.M., 78·1°; and at 10 P.M., 75·0° F. (23·92° C.) The highest observation in the sun was 104·8°, and in the shade 95·2°, and the lowest in the shade was 64·6°. In February the temperatures were higher, the mean having been 74·8° F. at 4 A.M., 80·1° at 10 A.M., 81·0° at 1 P.M., 80·0° at 4 P.M., and 76·8° at 10 P.M. The mean daily range is therefore small, having been only 6·1° in January and 6·2° in February. As, however, in the middle of the day, that is to say from 10 A.M. to 4 P.M., or, indeed, to 7 P.M., the air is decidedly dry, the moisture in the air

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between ten and four being in average about 75, saturation representing 100, the heat cannot be so very much felt except when at times it contains 90 per cent. or more of moisture. The percentage of moisture (relative humidity) varies much according to the time of day. Thus, in February, at 4 A.M., it was 89; at 7 A.M., 88; at 10 A.M., 79; at 1 P.M., 73; at 4 P.M., 78; at 7 P.M., 85; and at 10 P.M., 86; saturation being 100. At Rio Grande the mean by all thermometer readings in the month of December was 71·8°, the mean highest temperature recorded being 79·2°, and the lowest 68·9°, the mean relative humidity being 70°. In January the mean temperature was 76·2°, the highest in the shade 89·3°, and the lowest 69·3°, the mean relative humidity being 68°. In February the mean temperature was 72·5° F., the highest 81·3°, and the lowest 69·5°, the mean relative humidity being only 63°, which would make this a decidedly pleasant climate in February, and suitable for invalids requiring a warm, dry, and equable climate, except that very strong winds were prevalent in January and February, the direction of which is not mentioned.

Sull' Eziologia dell' Epidemia di Febbri Tifoide in Parigi. Par il Prof. PAGLIANI. Torino, 1883. Tipografia Celanza e Comp. Via Garibaldi 33.

In a paper contributed to the Journal of the Royal Academy of Medicine of Turin, and afterwards reprinted in pamphlet form, Professor L. Pagliani discusses the influence of the rainfall on the increase and decrease of the prevalence of enteric fever endemic in Paris. The author describes the course of the disease in that city from Nov. 1880 to Jan. 1883, and compares the variations in its prevalence with the variations in the rainfall during that period. The comparison is illustrated by a graphic chart, showing, on the one hand, the weekly admissions into the Paris hospitals of cases of enteric fever and the weekly deaths from that fever; and, on the other hand, the weekly fall of rain (in millimetres) during the period above mentioned. The chart shows that an increase in the rainfall was constantly followed by an increase in the number of admissions and in the number of deaths; the increase in the number of cases and of deaths taking place after intervals of one to two weeks and four to five weeks respectively—intervals corresponding pretty closely to the incubation period of the disease and the period that elapses in fatal cases before death ensues. The remarkable accord thus appearing between the curve of rainfall and the curves indicating the prevalence of the disease points clearly, in the author's opinion, to a close relation between the meteorological phenomenon and the disease.

This relation the author believes to be a causal one, and he is of opinion that the influence is exerted not directly by the rain falling on polluted soil, setting up decomposition, and so causing the development of typhoid germs, but indirectly through the medium of the sewer system. When a considerable fall of rain occurs, the main sewers become flooded, and an obstacle is thus opposed to the discharge into them of the contents of the branch sewers and house drains. As a consequence, regurgitation takes place in the latter, not only of their recent contents, but also of the filthy slime which in dry weather tends to become deposited in the smaller branches; oozing takes place through the walls of the drains (which are never really impermeable) into the soil beneath the houses; and the gases evolved are forced backward into the houses themselves. This sequence of events would naturally, the author believes, give rise to an increase in the prevalence of the endemic disease; and as a proof of the explanation thus offered he describes the distribution of the disease during the recent epidemic. In that epidemic those districts suffered early and severely which were situated near the great departmental *collecteur*, the *collecteur* which of the three received the most impure sewage; generally speaking, the parts of the city most affected were those which lay low, where the secondary sewers join the great collecting sewers, and where, therefore, the tendency to regurgitation was greatest; and, finally, the disease was especially severe in the vicinity of such parts of the sewers as contained sudden bends or were otherwise liable to have deposited in them the filthy slime already alluded to.

An increase in the rainfall, however, is not necessarily followed by a corresponding increase in the prevalence of the disease; the extent of the increase in the latter greatly depends also on the character and circumstances of the increase in the former. Thus a fairly heavy downfall of rain in December 1882 was followed by a comparatively slight recrudescence of the endemic in the following January and February, while a smaller amount of rain in the end of February and beginning of March was followed by a more considerable increase in the cases of deaths from the disease in the end of March and the beginning of April. In the former case, the fall was gentle, and took place when the sewers were kept pretty well flushed by the usual winter rains; in the latter, it came on after two months of drought, during which there was abundant opportunity for the slimy deposit to form in the drains.

On the whole, the author is convinced that in the existing state of the sewerage arrangements of Paris the rainfall has a very decided influence in determining the degree of prevalence of enteric fever. As a remedy of the evil he strongly insists on the absolute necessity of complete separation between the water polluted by human excreta and animal refuse on the one hand, and the rain water, together with the refuse water of manufactories, &c., on the other. The former, he advocates, should be applied to the purposes of agriculture, the solid constituents being separated from the liquid by means of the '*fosses mobiles*,' or the 'pneumatic system' of Liernur. The latter should be rapidly carried away by means of a proper system of drains, which should also be so constructed as to drain the soil and keep the ground water at a definite level.

SANITARY JOTTINGS.

LOCAL.

The Teignmouth Local Board and Urban Sanitary Authority, on re-appointing the medical officer of health, have increased his salary from 50*l.* to 60*l.* per annum.

The Glanford-Brigg Guardians and Rural Sanitary Authority, on re-appointing the medical officer of health, reduced his salary from 150*l.* to 120*l.* per annum. This the Local Government Board refused to sanction, and the subject was fully discussed at the last meeting of the Rural Sanitary Authority, but they affirmed their former resolution by a large majority.

The Amersham Guardians and Rural Sanitary Authority, on re-appointing the medical officer of health, have reduced his salary from 100*l.* to 50*l.* per annum.

The St. Faith Guardians and Rural Sanitary Authority have been invested with the powers of an Urban Sanitary Authority under Sect. 157 (2) and (4) and Sect. 158 of The Public Health Act, within the contributory places of Catton and Sprowston.

LEGAL.

At the Coventry City Police-court, Mr. James Walton, butcher, Coventry, who holds some large Government contracts, was fined 20*l.* and costs for having on his premises the carcases of two diseased sheep in preparation for sale, but quite unfit for human food. Mr. Frederic Booker, the inspector, stated that the carcases had been dressed, and that he saw them hanging up in the defendant's premises in the usual way; but before he could seize them they were thrown into a blood tub, from which he subsequently rescued them, and, with assistance, took them before a magistrate, who condemned them and ordered them to be destroyed in the usual manner.

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CORRESPONDENCE.

[All Communications must bear the signature of the writer, not necessarily for publication.]

THE INFLUENCE OF STORMS UPON WATER-TRAPS.

After reading Mr. Masters' letter on p. 591, I again read his remarks on pp. 452–53, and adhere to what I said on p. 535, to the effect that Mr. Masters' diagram on p. 452 is misleading. I still do not believe that with a 2-in. air-pipe and a water-trap with 1½ in. or so of water-lock, the sewer air would bubble up through the water in the trap as shown, and especially that the greater part of the air passing through the drain-trap would bubble through the closet-trap with a 2-in. air-pipe on its outer side. If a sham air-pipe of only half-inch gas-pipe were used, then the trap might be forced.

From his remarks Mr. Masters seems to assert that the sewers and drains at Bristol are so put in as that during a heavy rain the sewer air is forced back through the drain-traps, and has to find its exit either up the ventilating pipes of the soil-pipes or else through the closet-traps into the houses.

Now, in my opinion, if this is the real practice in Bristol, it is a very bad one, and the sooner it is altered for the better so much the better for all concerned.

If Mr. Masters' design has been to expose a bad system I would wish him all good success in his endeavours to improve it.

In my letter on p. 535, last line, for 'rising,' read 'that is.'

W. P. Buchan, S.E.

Glasgow, June 28, 1883.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

No doubt many of your readers will look for further information respecting the above association, therefore I beg of you to insert this communication. A general meeting will be held on Saturday the 28th inst., at 7 o'clock, at the Holborn Town Hall, Gray's Inn Road, W.C., when a code of rules and a number of other matters of importance will be submitted for the consideration of those inspectors present, and on behalf of the provisional committee I am desired to say, that we shall be pleased to see as many present as can possibly attend. Notices with rules will be sent to all inspectors, Metropolitan, urban, and rural, in Middlesex, and each county adjoining, and if any should be passed over, and wish for information concerning the association and will address me, I will then send them notice and rules with pleasure. In the rules referred to provision is made for admission of 'Associates,' such being interested in the objects of the association and approved by its council. In conclusion, Sir, I cannot let this opportunity pass without thanking you heartily for the very great assistance which your insertion of my letters has given to me personally, and to the end which I have in view, and that is the firm establishment of such an association as shall be a credit to all sanitary inspectors, honorary members and associates connected with it, and then perhaps it is not too much to add of society at large, and I hope that we shall find our monthly meetings, beginning October next, reported in your valuable columns. I again thank each and all of those friends who have so readily seconded my efforts.

Samuel C. Legg.

62 Gayhurst Road, Dalston, E.

THE EXAMINATION OF SANITARY INSPECTORS.

Sir,—Discussing a few days ago with a brother inspector the questions put by the Sanitary Institute of Great Britain to inspectors, one especially, which related to the cubical space required for sleeping for one adult, &c., occasioned some contradiction by me, because there seemed to be an opinion that (300) three hundred cubic feet of space was enough. This surely is absurd. I was told, however, one inspector had passed who gave that as his answer. Surely this could not be true. Would it not be better to put such a question in the form lately put by Professor Corfield at the Society of Arts examinations—viz., the question, and then 'state your reasons for your opinion,' &c.? This would dispense with simple rule of 'thumb' or 'cram work.' This I hope will be taken in good part. I am very well aware of the great good being done by the Sanitary Institute of Great Britain, and am thankful for it.

C. W. S.

PARKS AND OPEN SPACES.

Ornamental Burial Grounds.—An application has been made to Dr. Tristram, the Chancellor of London, for a faculty to lay out the burial ground of St. George's, Bloomsbury, at the rear of the Foundling Hospital, as a 'public garden.' The estimated expense was 337*l.*, which would be provided by the Kyrle Society. The parish of St. Pancras, in which parish the ground was, would keep the garden in order, and it would form with seats a resting place for both parishes. The application was made under the Metropolitan Open Spaces Act, 1881. The learned Chancellor granted the faculty, and gave permission for the works to be commenced forthwith. The case would be subject to any arrangement with the two parishes under the Metropolitan Open Spaces Act.

The Shoreditch Burial Board has resolved to open the parish churchyard of St. Leonard, during certain hours of the day, to the public for recreative purposes.

The committee of representative managers of London Board Schools has adopted a motion, proposed by the Rev. S. A. Barnett, to ask the Board to authorise managers to make arrangements for opening the playgrounds out of school hours to all children of school age.

The Society for Promoting Window Gardening among the Working Classes in the parishes of St. Margaret and St. John, Westminster, of which the late Canon Conway was the originator, held its eighteenth annual flower show on the afternoon and evening of July 10. Fifteen money prizes, not exceeding 10*s.* each and not less than 3*s.*, were awarded to working men and women and to children attending parochial, national, and other schools for the best fuchsias, geraniums, and other plants in the whole display; and, in addition to these prizes, rewards were given to competitors from the different parochial districts for the best exhibit in each district. Altogether 140 prizes were offered, producing a highly creditable competition. Floriculture among the poor of Westminster—originally, perhaps, stimulated by the hope of pecuniary gain—now seems to have become a labour of love; and the gentle, humanising influence it has indirectly exerted attests the value of the society by whose agency this good has mainly been wrought. Dean's Yard was well thronged, the admission money providing the prizes, which were, as usual, distributed in the open air by Lord Shaftesbury, in the presence of a large assembly, which included the Duke of Albany, Lord Aberdeen, the Lord and Lady Mayoress, the Dean of Westminster and Mrs. Bradley, and Canon Barry.

Mr. Bryce has given notice of a motion declaring that, in view of the generally recognised necessity of providing open spaces in London, and of the widespread desire expressed for the formation of a public park at Paddington, the Ecclesiastical Commissioners ought not to be parties to the leasing for building purposes of any land forming part of the site of the proposed park until an opportunity has been given to the inhabitants of London of deciding on the proposal to establish such a park by means of a new municipal authority for London.

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COMPETITIONS.

THE INSTITUTION OF CIVIL ENGINEERS.

PREMIUMS AWARDED.—SESSION 1882–83.

THE Council of the Institution of Civil Engineers have awarded the following Premiums amongst others for papers read at the ordinary meetings :—A Telford Medal and a Telford Premium to William Anderson, M. Inst. C.E., for his Paper on 'The Antwerp Waterworks.' A Telford Medal and a Telford Premium to Alexander Leslie, M. Inst. C.E., for his Paper on 'The Edinburgh Waterworks.' A Telford Premium to John George Gamble, M.A., M. Inst. C.E., for his Paper on 'The Waterworks of Port Elizabeth, South Africa.' A Telford Premium to William Morris, M. Inst. C.E. (of Deptford), for his Paper on 'Covered Service-Reservoirs.'

EXHIBITIONS.

INTERNATIONAL EXHIBITION AT NICE, 1883–84.

THE following circular was drawn up and approved by a meeting held at the house of the Society of Arts on June 26, 1883 :—

We beg leave to invite your attention to the classification of objects proposed to be exhibited in the Sanitary and Medical Section of the Exhibition which is to be opened at Nice in December next. (See SANITARY RECORD for June 15, page 591.)

We congratulate the Mayor and Municipality on their recognition of the fact that a health resort needs more than Nature, bounteous though she may be, can ever bestow. Nature gives warmth, bright skies, brilliant sunshine, but it is for man to care that nothing shall be found which can beget disease or hinder recovery. The sanitary condition of the Riviera is of vital importance to thousands of British subjects who annually visit it in search of health; and there can be no doubt that the Exhibition which is to be held will do much to stimulate sanitary progress throughout the entire district. The wise forethought of the authorities at Nice has led them to take the important step of organising this Exhibition, and we heartily wish success to the undertaking, and invite our countrymen to co-operate. We ask more especially for the co-operation of all whose occupations make them familiar with sanitary needs, and whose endeavours are constantly directed to supply them; such as engineers, architects, manufacturers of sanitary apparatus, as well as pharmaceutists, and the makers of various instruments.

We earnestly recommend the undertaking to general support.

(Signed)

HENRY ACLAND, M.D., F.R.S., Regius Professor of Medicine in the University of Oxford.

HENRY BENNET, M.D., Mentone.

T. E. CHARLES, M.D., Cannes.

F. DE CHAUMONT, M.D., F.R.S., Professor of Hygiene at the Army Medical School, Netley.

A. CLARK, M.D., Physician to the London Hospital.

W. H. CORFIELD, M.A., M.D., Professor of Hygiene at University College, London.

W. EASSIE, C.E., Member of the Société Française d'Hygiène.

JOSEPH FAYRER, K.C.S.I., M.D., F.R.S., President of the Indian Medical Board, &c.

ROGERS FIELD, B.A., Member of the Institution of Civil Engineers, Vice-President of the Meteorological Society.

PHILIP FRANK, M.D., Cannes.

DOUGLAS GALTON, Capt., R.E., C.B., F.R.S., D.C.L.

MARK JUDGE, A.R.I.B.A.

JAMES PAGET, F.R.S., Sergeant Surgeon to H.M. the Queen.

G. VIVIAN POORE, M.D., Professor of Medical Jurisprudence at University College, London.

RICHARD QUAIN, M.D., F.R.S., Consulting Physician to the Hospital for Consumption, Brompton.

ROBERT RAWLINSON, C.B., C.E., Chief Engineer, Inspector to the Local Government Board; Member of the Army Sanitary Committee.

JOHN SIMON, C.B., late Medical Officer of the Privy Council.

P. GORDON SMITH, Architect to the Local Government Board.

SYMES THOMPSON, M.D., Physician to the Hospital for Consumption, Brompton.

ERNEST TURNER, F.R.I.B.A., Member of Council of the Sanitary Institute of Great Britain; Member of the Société Française d'Hygiène.

W. H. WALSHE, M.D., Emeritus Professor of Medicine, University College, London.

T. SPENCER WELLS, President of the Royal College of Surgeons of England, Surgeon to the Queen's Household.

CHARLES WEST, M.D., Nice.

C. T. WILLIAMS, M.D., Physician to the Hospital for Consumption, Brompton.

Official agents for Great Britain, Messrs. J. M. Johnson and Sons, Limited, 1 Castle Street, Holborn, London, to whom applications for space must be made, and from whom all information can be obtained.

APPOINTMENTS UNDER THE PUBLIC HEALTH ACT.

MEDICAL OFFICERS OF HEALTH.

ARMSTRONG, Leonard, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Newton Abbot Rural and Dawlish Urban Sanitary Districts until Michaelmas, pending a proposed re-arrangement of the late combination of districts.

BRICKWELL, Benjamin Arthur, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Amersham Rural Sanitary District, at £50 per annum.

BROCKLEHURST, Thomas Howard, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Matlock Urban Sanitary District, at £15 for one year, *vice* Knox, whose appointment has expired.

CURTIS, William, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Alton Urban Sanitary District, at £20 per annum for three years, *vice* Leslie, whose appointment has expired.

FAUSSET, Herbert John, M.D.Univ.Dub., has been re-appointed Medical Officer of Health for the Tamworth Urban Sanitary District, at £30 for one year.

GIDDINGS, William Kitto, M.R.C.P.Edin., M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Calverley Local Board and Urban Sanitary Authority, Yorkshire, at £18 per annum for three years.

HARRIS, Charles, M.D.Univ.St. And., M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the No. 2 sub-district of the Rye Rural Sanitary District, at £25 for one year.

HICHENS, James Stacey, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Redruth Urban Sanitary District, at £15 15s. for one year.

KING, James, M.B., C.M., has been appointed Medical Officer of Health for the Leigh Urban Sanitary District, Lancashire, at £70 for one year. *vice* Hall, whose appointment has expired.

KNIGHT, John Tomlinson, M.R.C.S. Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Carlton Urban Sanitary District at £30 per annum.

LAKE, William Charles, M.D.Univ.St. And., M.R.C.S.Eng., L.S.A. Lond., has been re-appointed Medical Officer of Health for the Teignmouth Urban Sanitary District, at £60 per annum.

LAWSON, Joseph, M.B.Univ. Dub., L.R.C.S.Irel. and L.M., has been re-appointed Medical Officer of Health for the combined Hebden Bridge Urban and Todmorden Rural Sanitary Districts, at £70 per annum for two years.

MASON, George, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Wisbech Urban Sanitary District, at £40 for one year.

MOXON, James Burdett, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Glanford-Brigg Rural Sanitary District, at £120 per annum.

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MURPHY, Wm. Ponsonby, L.R.C.S.Irel. and L.M., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Wigton Rural Sanitary District, at £80 per annum.

QUICK, John, M.R.C.S.Eng. and L.M., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Penzance Rural Sanitary District, at £80 for one year.

SANDFORD, Horace Vavasour, L.R.C.P.Lond., has been re-appointed Medical Officer of Health for the combined Bromyard, Hereford, Ledbury, Leominster, and Weobley Rural Sanitary Districts, at £300 per annum for three years.

SKINNER, Robert Vaile, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the No. 3 sub-district of the Rye Rural Sanitary District, at £15 for one year.

WILLIAMS, Frederick, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Launcester Rural Sanitary District, at £30 for one year.

WOODHAMS, John Amos, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the No. 1 sub-district of the Rye Rural Sanitary District, at £20 for one year.

SURVEYORS, CLERKS TO GUARDIANS, INSPECTORS OF NUISANCES, &C.

BASTARD, Mr. George Rayner, has been elected a member of the Uxbridge Local Board and Urban Sanitary Authority, *vice* Jones, deceased.

BAXTER, Mr. Edward, has been elected a member of the Worksop Local Board and Urban Sanitary Authority, *vice* Cartledge, resigned.

CHATER, Mr. T. J., has been re-appointed Inspector of Nuisances for the Rugby Urban Sanitary District, at £65 per annum, for three years.

CLAYTON, Mr. Richard, Banker, has been appointed Treasurer to the Morpeth Guardians and Rural Sanitary Authority, *vice* Wilkinson, deceased.

DIVER, Mr. Charles, Solicitor, has been appointed Clerk to the East and West Flegg Guardians, to the Rural Sanitary Authority, to the Assessment Committee, and to the School Attendance Committee, and Returning Officer, at £100 per annum for all duties, *vice* Cory, resigned.

DRAYTON, Mr. John, has been re-appointed Inspector of Nuisances for the Glanford-Brigg Rural Sanitary District at £100 per annum, and Surveyor at £10 per annum.

ELDBOROUGH, Mr. Charles Marryat, Solicitor, has been appointed Town Clerk and Clerk to the Urban Sanitary Authority at Croydon at £800 per annum, with professional charges for parliamentary and other business.

FIELD, Mr. William, has been elected a member of the Tipton Local Board and Urban Sanitary Authority, *vice* Whitehouse, resigned.

GOODWIN, Mr. William M., has been appointed Treasurer to the Bakewell Local Board and Urban Sanitary Authority, *vice* Parker, deceased.

HARKINSON, Mr. James, Manager of the Matlock Bridge Branch of the Sheffield and Rotherham Bank, has been appointed Treasurer to the Matlock Local Board and Urban Sanitary Authority, at £10 per annum, *vice* Parker, deceased.

HOLT, Mr. G., has been elected Chairman of the Northallerton Local Board and Urban Sanitary Authority.

HOPKINS, Mr. Henry Herbert, Manager of the Stoke Branch of the National Provincial Bank of England, has been appointed Treasurer to the Corporation and Urban Sanitary Authority of Stoke-upon-Trent, *vice* Hutchings, resigned.

JEFFERIES, Mr. G. A., has been appointed Inspector of Nuisances for the Amersham Rural Sanitary District, at £75 for one year.

POWELL, Mr. Thomas, has been appointed Treasurer to the Madeley Guardians and Rural Sanitary Authority, Salop, *vice* Wilkinson, resigned.

SPARROW, Mr. C., has been elected a Member of the Ellesmere Local Board and Urban Sanitary Authority, *vice* Thomas, resigned.

TUCK, Mr. Arthur W., has been appointed Clerk to the Oakham Guardians and Rural Sanitary Authority, *vice* Hough, resigned.

WALKER, Mr. William, has been re-appointed Inspector of Nuisances for the Carlton Urban Sanitary District, at £20 per annum.

WARD, Mr. Edward Thwaites, has been appointed Treasurer to the Lytham Improvement Commissioners and Urban Sanitary Authority, *vice* Loxham, resigned.

WEARING, Mr. William, has been appointed Treasurer to the Faringdon Guardians and Rural Sanitary Authority, *vice* Cull, resigned.

WEBSTER, Mr. Peter John, has been appointed Clerk to the Dwygyfylchi Local Board and Urban Authority, Carnarvonshire, at £50 per annum, *vice* Jones, resigned.

WILSON, Mr. R. A., has been appointed Clerk to the Amesbury Guardians and Rural Sanitary Authority, *vice* Mr. R. M. Wilson, deceased.

WILSON, Mr. F. R., has been re-appointed Inspector of Nuisances for the Alnwick Rural Sanitary District, at £100 per annum.

WOOD, Mr. William, Solicitor, has been appointed Clerk to the Southam Guardians and Rural Sanitary Authority, at £80 per annum; as Clerk to the Guardians, £15 per annum; as Clerk to the Rural Sanitary Authority, £10 per annum; as Clerk to the School Attendance Committee, £5 per annum; as Returning Officer, and such remuneration as Clerk to the Assessment Committee, as may be annually fixed, *vice* Mawley, deceased.

WRIGHT, Mr. George Wheldon, Collector to the Matlock Local Board and Urban Sanitary Authority, has been appointed Inspector of Nuisances also, at £20 per annum, *vice* Bourne, the Board having decided that the duties of Surveyor and Inspector of Nuisances would be more efficiently carried out by separate persons.

LOCAL BOARDS AND BOARDS OF IMPROVEMENT COMMISSIONERS AND URBAN SANITARY AUTHORITIES.

Members elected for the ensuing three years pursuant to 38 and 39 Vict., c. 55 (the Public Health Act), and other Acts, viz. :—

ABERDARE.—John Williams, Edward Morgan, David Price Davies, William Little.

ABERGELE AND PENSARN.—*John Carrington, David Edwards, Arthur Pritchard, William Littler.

ABERTILLERY.—*S. J. Hall, James Edwards, Rev. E. Davies, John Ward Williams, W. Gilbert Jones.

ALFRETON.—Joshua Roberts, W. Parsons, T. Willgoose.

ALNWICK AND CANONGATE.—*Adam Robertson, *Luke Scott, *George Simpson, Charles Percy, *Thomas Walby, Richard Archbold.

ALTON.—*Edwin Loe, Tom Cox, Henry Piggott, *Charles Burrell.

ALTRINCHAM.—*John Newton, *John Ambler, *William Griffin, James Boyd.

ALVASTON AND BOULTON.—*William Riley, *Thomas Riley, Isaac Allen.

ALVERSTOKE.—Alfred Balliston, George Cooke, Edwin Lapthorn, Edward Field, Henry Alfred Ridout, Frederick Loney, J. H. F. Treacher, John Tappenden, John G. Parham.

ASHBOURNE.—John Thomas Marple, William Barnes, Richard Cooper, William Wise, J. A. Johnston.

ASHFORD.—*John Watson, *George Alfred Spain, William Wainwright, *John Broad, *John Dobree Norwood, *William Fowler Harvey, *Frederick Worger.

ASHTON-IN-MAKERFIELD.—*Edward Burchall, Thomas Crompton, *Theodore Drayton Grimké, *Adolphus B. Moubert, *Joseph Pimblett, *Henry Siddall, *James Wright.

ASPULL.—*Wm. H. Hewlett, *F. S. Gerard, *John Abbott, John Simm.

ATHERTON.—*John Bullough, *A. Burrows, J.P., *Robert Sephton, *John Davies, *Wm. Grundy.

AUDENSHAW.—*Robert Grundy, Paul Grundy, Richard Robinson, *William Oldham Bridge.

AUSTONLEY.—*Jos. Barroucloogh, *Frederick Marsden, *Green Roberts.

AWRE.—*Rev. Alexander David Pringle, *Joseph Philpotts, *Stephen Adolphus White.

AYLESBURY.—*H. A. P. Cooper, *R. Dickins, E. T. Mackrill.

BAILDON.—J. Taylor, John Rhodes, William Wright.

BALA.—Richard Owen Jones, William Evans, Robert Jones, John Parry.

BALDOCK.—*Thomas Rigby Kewley, *Edward Fossey Bally, *William Richardson (he declines to serve).

BAMPTON.—*Rev. Edward Rendell, *John Trowey Periam, *George Frost.

BANBURY.—Wm. Denchfield, Wm. Palmer, George Crosby.

BANGOR.—Robert Roberts, Meshach Roberts, John Lloyd.

BARKISLAND.—Thomas Hanson, Simeon Helliwell, Joseph Riley.

BARMOUTH.—John Jones Griffith, David Thomas, William Williams.

BASLOW AND BUBNELL.—*William Hattersley, John Wainwright.

BATTLE.—Chas. Armstrong, Jonathan Jenner, Craven Smith.

BECKENHAM.—John E. Radcliffe, Wm. Jno. Lavington, Hy. Wm. Wood, *Peter McKinlay.

BEDLINGTONSHIRE.—Ralph Dodds, George R. Charlton, Thomas Glassey.

BEESTON.—*John Walker, John Whitehead, *John Pollard.

BELPER.—John Hunter, Septimus Stone, Samuel Beresford.

BENFIELDSIDE.—James Annandale, Joseph Eltringham, Joshua Lax, William Wheatley.

BENWELL AND FENHAM.—*J. W. Pease, *Ralph Brown, *J. S. Challoner.

BICESTER.—*J. Horwood, *E. Checkley, *S. Baker, *T. Paxton.

BIDDULPH.—*H. W. Williamson, *T. W. Twyford, *Thomas Cottrell.

BILLINGE.—*Elias Daniels, *Thomas Mather, John Makin.

BINGLEY (Local Board).—*Joshua Laycock, *William Sugden, John Hartley.

BOLLINGTON.—*William Henshall, *Henry Arthur Henstock, George Brooke, Thomas Creswick Oliver, *Joseph Snape.

BOURNEMOUTH.—C. C. Creeke, M. R. Cotes, H. Newlyn, *G. R. Elwes, J. Hartley, *Edward Jennings, C. R. Hutchings.

BOWNESS.—*J. Brownrigg, *G. H. Pattinson, *Captain Elms.

BRAINTREE.—R. Crickmore, S. White, J. Claydon.

BREDBURY AND ROMILEY.—James Wood, Richard Harvey, Thomas Booth, Joseph Arundale, Simeon Hopwood, John Haughton.

BRIDGEND.—George Fenton Lambert, *Hugh Bevan, John Hemming.

BRIDLINGTON.—Richard Richardson, Leonard Mainprize, William Butterfield, Lee Steere Steere; and Charles Mann, to fill a casual vacancy.

BROADSTAIRS AND ST. PETER'S.—*J. Blackburn, W. S. Blackburn, *E. S. Goodson.

BROMBOROUGH.—*Richard Davies, *Kingston G. Woodham, *James D. Thorburn.

BROMLEY (Kent).—*James William Ilott, *Charles Lamb, *William Lownds, Henry Balding.

BROUGHTON.—Samuel Grant, Thomas Johnson Holt, John George Taylor.

BROWNHILLS.—*Joseph Thomas Bayley, Joseph Dolphin, *Tertius John Taylor.

BRYNMAWR—William Evans, Thomas Hope, David Watkins, Richard Ward Williams.

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BUDLEIGH SALTERTON.—James Larcombe, *William Walters, *John Born.

BUGLAWTON.—*Anthony Shaw, *William Bowler.

BULKINGTON.—*William Worthington Orton, William Satchell, William Till.

BURNHAM.—*Thomas Dare, James Keats, *Henry Rendall.

BUXTON.—*E. C. Milligan, *Charles Wilkinson, Major Goring, Robert Hulme.

CAERLEON.—*William Griffiths, Thomas Parry, James Jarret, James Maslin, Rev. Canon H. P. Edwards.

CALNE.—*R. Henly, *John Dommett Bishop, *H. C. Henly, *William S. Bennett.

CAMBORNE.—*Josiah Thomas, No. 1, *Charles Thomas, John Pool, Josiah Thomas, No. 2.

CANNOCK.—*Frederick Henry Gilpin, *Thomas Evans, *John Green.

CARLTON.—Francis Cave, William Kirk, Alfred Cooke.

CASTLEFORD.—*Job Harling, James Farquhar, Joseph Reynolds.

CHATHAM.—*James Breeze, *Charles Bessent, *John Foord, *Anthony John Knowlden, John William Taylor.

CHESHUNT.—*Samuel Austin, *John Dewey, *Thomas Allsup Hewitt, Samuel James Woolley.

CHIPPENHAM.—George Bishop, William Austin, Rev. Canon Rich, George Hathaway, Rev. H. B. Bardwell.

CHRISTCHURCH (MON.).—*John Bladon, *James Harris, Daniel Happerfield.

CIRENCESTER.—*Robert Alexander Anderson, *Richard Cole, *William Henry James, *Charles Septimus Smith, John Mullings.

CLAINES.—H. Weaver, Edwin Yeates, G. A. Bird.

CLAYTON-LE-MOORS.—*Denis Towers, James Foster, Thomas Macintosh, Joseph Horrocks.

CLAYTON-WEST.—*John Karye, *William Waites, *William Thompson Beanland.

CLEATOR MOOR.—*John Fletcher Kirkconel, *Thomas Moffat, *John O. Burchall, Henry Turner.

CLECKHEATON.—*John Hirst, *Benjamin Holdsworth Goldthorp, *John Hutchinson Knowles, Israel Umpleby, John Thornton, Robinson Driver.

CLEETHORPES.—Frederick Arthur Peck, Christopher Kirkman, Anthony Frith, Thomas Charles Gray.

CLEE-WITH-WEELSBY.—*David Brocklesby, *Charles Jeffs, William Moss, *Cooper Snowden.

CLEVEDON.—John Maynard, John Griffin, *Thomas Har tree.

COLEFORD.—*John Trotter Thomas, *William Nelmes, *Henry Allford.

COSELEY.—William Allen, Job Smallman, *Isaiah Dicken, *Enoch Gittings, S. L. Millington, E. W. Lewis.

COTTINGHAM.—*David Wilson, *C. H. Ringrose, *W. J. Atkinson; and George William Hart, *vice* Ross, resigned.

COWPEN.—Daniel Kelly, William Thompson, Thomas Hindmarch, James Pattison.

CROSTON.—*John Ascroft, *Thomas Croston, *Matthew Hackforth.

CROWLE.—John Drury, *William Dawson Margrave, *James Wilson.

CRUMPSALL.—*Walter Somerville Kinch, *William Butterworth, Robert P. Hewit.

CUMBERWORTH.—*John Addy, *William Moseley.

DARLASTON.—*G. P. Butler, *David Etchells, James Harper, *George Humpage, *Simeon Partridge, *William Winn, Joseph Yardley.

DENBY.—*John Kenyon, *Henry Lockwood, *James Moore.

DODWORTH, Rev. Thomas Thornley Taylor, *John Woodcock Ownworth, David McCoubrey.

DOLGELLY.—*Humphrey Lloyd Williams, Thomas Roberts, Richard Mills, Evan Jones.

DORKING.—*John Young, *W. W. Clark, *J. L. Playfoot, *J. Todman.

DROYLSDEN.—*John Kay, *Joseph Hall, Bristow Flint Cartwright.

DUKINFIELD.—James Avison, *John Ashworth, *Thomas Beeley, *James Halstead, John Sykes, Henry Woolley.

EALING.—J. Allen Brown, *A. H. Johnson, *H. C. Green, *J. K. Wright.

EASTBOURNE.—C. Tomkinson, W. Routledge, Robert Colgate, Nevill Strange, C. N. Hayman, W. A. Cardwell, R. Francis, Charles Simmons.

EAST COWES.—*Richard Lihou Roberton, David Baldry, Joseph Buckland, *Nathaniel Roberton, Thomas Whiteman.

EAST STONEHOUSE.—*Thomas Taylor, *Thomas Skinner Bayly, *John Friend, *George Lake, *Richard Lyne Blight, *George Phillips, *Uriah King, *John Perry.

EBBW VALE.—*William Lloyd, *Thomas Morgan, *Lewis Morgan.

ECCLESHILL.—Wm. Holmes Hutton, *John Eastwood Scott, David Smith, Edwin Galloway, Joshua Bell.

EGREMONT.—*James Baird, *John Lindow, *John Mitchell.

ELLAND.—*Jno. Ramsden Crowther, James Thornton, Richard Marsden, *Benjamin Pilling.

EMLEY.—*Henry Hammerton, Henry Hampshire, Wm. Dickinson.

ERITH.—*Charles Beadle, *Rev. John Eastwood Martin, Thomas Heaps.

EXMOUTH.—Messrs. Ellett and Sherwin, Sir John Phear.

FAILSWORTH.—Robert Wright, *George Whitehead, James Wild, John Tongue, *Abraham Taylor, Thomas Jackson.

FAIRFIELD.—Silas Bennett, Joseph Slater, *James Shirt, Philip Hinch, William Haslam.

FALMOUTH.—*John Jonathan Skinner, *William Broad, *Henry James Rusden, *William Henry Lean, *William Slade Olver, Edwin Thomas Turner.

FARNWORTH.—John Melton Bateman, Robert Alexander Clarke Walter Dyson, George Foster, William Sumner, Alfred Topp.

FARSLEY.—*Edwin Woodhouse, *John Wilson, *Joseph Gaunt.

FAVERSHAM.—Robert Murton, John K. Ashbee, Thomas Gillow, Nicholas Murton, William Clifford, William Richard Gorham, Benjamin Leese, Samuel Higham, Hafford Fielding, Frederic Johnson, Richard Beale Neame, John Minter, Albert Thomas Curling, Thomas Minter, William Carter, William Roper Dixon, John Henry Howard, William Culver, Walter Charles Stunt, Charles Neame, William Butcher, Henry Amos, Henry Read, Henry Collard, Henry Thomas Bensted, Frank Bridge Cobb.

FEATHERSTONE.—Messrs. *Fearnley, *Andrew, and *Waller.

FENTON.—*George Hallam, *John Myatt, *Joseph Gimson, *William Hawker.

FILEY.—*Robert Cammish, John Glaves Gofton, FitzGeorge Rowe.

FLOCKTON.—No nominations were made, and consequently the two seats are vacant.

FROME.—*George A. Daniel, *Edward Flatman, *Edmund G. Ames, *Charles Case, William Baily.

GARSTON.—T. B. Royden, J. E. Sheppard, James Wood, W. G. Killick.

GILDERSOME.—J. W. Helliwell, Robert Holliday, Thomas Cocker, Sam Buttrey; and Joseph Scargill to fill a casual vacancy.

GOMERSAL.—*Frank Burnley, John Rhodes, John Scott, Benjamin Craven.

GOOLE.—Messrs. Grayburn, Jackson, and *Wright.

GORTON.—*Daniel Irvine Flattely, *George Hy. Grimshaw, *George Hill Underwood, Edwin J. Reynolds.

GRASMERE.—*Edward Brown, *Robert Jackson Partridge, John Green.

GREAT CROSBY.—*Edward William Cropper, *Thomas May Smith, Thomas Barnes Clarke.

GREAT DRIFFIELD.—James Elgey, James Hopper, George Moore Foley, *Thomas Dyson Whitaker, William Scotchburn.

GREETLAND.—Thomas Brooke, John Smith, Benjamin Taylor, Thomas Wadsworth.

GUISBOROUGH.—*Charles Ovington Ord, *Alfred Edward Pease, *George Page, *John Clarke.

GUNTHWAITE AND INGBIRCHWORTH.—Luke Taylor, Charles Wood, William Horn.

HANDSWORTH (YORKSHIRE).—Stephen Bacon, Ed. M. Dickens, Frank Sibray, Richard Row, Wm. Jno. Hooley.

HARROGATE.—*James Simpson, *Joseph Stephenson, *William Taylor, *Joseph T. Walker, George Dawson, Nicholas Carter, Wm. Henry Milner.

HARROW.—*Thomas Charles Hudson, William Edward Taylor, John Chapman.

HAVANT.—Samuel Clarke, James Softly, George Whicher, William T. Leck, H. J. Green.

HAY.—*Francis Robert Trumper, *Charles Griffiths, *James Morris.

HEBDEN BRIDGE.—Joseph Ashton, *Thomas Crabtree, *Joseph Greenwood, *Stansfield Helliwell, *John Horsfall, James Lister, James Winterbottom.

HECKMONDWIKE.—*Joss Walshaw, *John Wood, Joseph Fawcett, Thomas Mitcheson.

HERNE BAY.—R. Barnwell, S. Gibbs, T. Waller, N. Bowden.

HIGHER BEBINGTON.—*Andrew Pearson, *Thomas Simpson, *Andrew Tucker Squarey, *John Thomas.

HINCKLEY.—*Andrew Cooper, *Thomas Kiddle, *George Hall, Samuel Goode, George Porter.

HOLBEACH.—John Carbutt, William Rowell, Joseph Ward.

HOLME CULTRAM.—*William Fletcher Wilson, George Liddle, William Crabb, John Barwise.

HOLYWELL.—*Joseph Garner, Richard Sankey, *John Lloyd Price, David Williams (Cross Street), John Edward Jones.

HONLEY.—*William Henry Thornton, William Henry Robinson, *John Armitage Carter, *George William Oldham.

HORFIELD.—Robert Charles Smart, John Perryman Hartnell, Benjamin York.

HORNCASTLE.—*Jason Allison, *John Panton, *William F. Snartt, *Jesse Chatterton.

HORNSEY.—Charles Catling, Spencer Tom Homewood, Charles Turner, Henry Reader Williams, Cory Wright.

HORSFORTH.—William Hudson, jun., John Thompson, Richard Broadbent, Gabriel Francis Jeffery, *John Richardson.

HORSHAM.—*Edward Ingram Bostock, *R. Hunt, *E. Taylor, *G. B. Simpson, *A. Pennells.

HOVE.—James O'Brien, William Olding, Montagu David Scott, William Joseph Kelson Millard, Lindsay Stevenson Gresley Young, Cuthbert Athelstan Baines, Arthur Callaway, Francis Swanton Hurlock, Wigram Elliott Money, Benjamin Bradford Reed, Simon William Creagh, Richard Dawson, James Douglas Lilley, Charles Nye, jun., George Baldwin Woodruff, Joseph Nurcombe, Francis Yeates Toms, Thomas Washington.

HOYLAND SWAINE.—*Benjamin Pinder, John Armitage, Jacob Dearnley.

HUCKNALL-UNDER-HUTHWAITE.—T. Robinson, John Stringfellow, J. Wright.

HUNSWORTH.—J. G. Oddy, F. H. Pearce, J. Scott.

HURST.—Thomas Battersby, Henry Charlesworth, William Kershaw, James Whitworth.

IDLE.—Charles Turner, Benjamin Bottomley, Mark Pullein.

ILFRACOMBE.—*S. Day, *I. Chugg, *J. Braund.

INCE.—*Thomas Hatton, *Francis Percy, *William Waddington, Charles Gidlow Jackson, William Morton.

IVYBRIDGE.—*Whinfield Robinson, *B. W. Sherwell, Rev. G. W. Anstiss.

KENILWORTH.—John Bagshaw, *Luke Heynes. *R. S. Hodges, *Richard Robbins.

KETTERING.—*John Wallis, *William Toller, Abel J. Margetts.

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KIRKHEATON.—Fred Hudson, James Wilson, James Moulson, John France, Ephraim Sykes.

LAMPETER.—Rev. Rees Cribin Jones, *Thomas Edmunds, *William Jones, William Lloyd.

LAUNCESTON.—John Mortimer Strong.

LEADGATE.—*Luke Nicholson, *John Joseph Hedley, John H. Hudson, Matthew Robson.

LEEK.—*Thomas Shaw, *Stephen Goodwin, *Andrew Morton, *Charles Eaton, William Broster, William Shufflebottom, John Chapman Clemesha, John Sheldon.

LEES.—James Greaves, R. Whittaker, James Lord, James Dixon.

LEYLAND.—*Thomas Leatham Wall, Frederick Hackforth, William Swann.

LILLINGTON.—J. Harding, J. Whitmore, Dr. Horsfall.

LINTHWAITE.—*Richard Heaton, John Walker, John H. Sykes.

LITHERLAND.—*Richard Webster, *Thomas Harrison, *Robert Brown, Chris. Charles Cain.

LITTLEBOROUGH.—*Edmund Taylor, Henry Travis, *John Stott.

LITTLE HULTON.—Messrs. Beswick, Clegg, Ruffby, Roscoe, and the Rev. P. Roberts, M.A.

LITTLE LEVER.—*Richard Hayward, *Robert Johnson, *George B. Douglas, Robert Whitehead.

LLANELLY.—Richard Nevill, John Randell, William Howell, Robert Margrave.

LLANFAIRFECHAN.—Daniel Davies, Owen Griffiths, William Leicester.

LOFTUS.—G. H. Anderson, Robt. Sanderson, J. P. Petch, J. H. Bulman.

LONG EATON.—Messrs. *Austin, *Maltby, E. T. Hooley, and J. Wingfield.

LOUGHBOROUGH.—W. Rowland, A. Paget, W. Tidd, Henry Deane, — Moss.

LOWER BEBINGTON.—Middleton Beckett, John Smith, *Joseph Delamore, *Charles Morris.

LOWESTOFT.—This election takes place in September.

LYMINGTON.—*V. F. Dent, *E. Badcock, *C. Miller, *G. Grunsell, J. Neal, *Rev. P. O'Connell.

LYMM.—*Hugh Cameron, Daniel Rogers, John Thomason.

LYNTON.—Chas. Medway, John Heywood, Richard Hooper Vellacott, Philip Jones, Thos. New.

LYTHAM.—*James Parkinson, *Rev. William Pilling, *Joseph Collinson, William Brown Arminson, M.D.

MAESTEG.—*T. L. Roberts, *T. Thomas, James Barrow, L. G. Jones.

MALTON.—Robert Metcalfe, *Samuel King, Matthew Bartindale Slater, *William George Searle, *Seth Tinsley, Paul Hickes.

MALVERN.—Thos. Cox, jun., Rev. Henry Foster, Admiral J. W. Dorville, R. Vassar Vassar Smith.

MANSFIELD WOODHOUSE.—*T. Strutt, *Henry Booth, *G. Strutt.

MARPLE.—*Samuel Hodgkinson, *William Sidebotham, *James Westbrook.

MARSDEN.—H. Fisher, E. Wilkinson, C. Thornton, D. Schofield.

MATLOCK.—John Nuttall, John Turner, T. Boden, George Boden.

MATLOCK BATH AND SCARTHIN NICK.—*Samuel Robinson, *James Sheppard, *James Walter Wheatcroft.

MELTHAM.—*James Taylor, *Nimrod Earnshaw, John C. Teale, Dan Wood.

MELTON MOWBRAY.—Messrs. Large, Gibson, and Callis; and H. T. Woolhouse, Pickard Adcock, and William Betts, by the Board to fill casual vacancies

MERTHYR TYDFIL.—*Thomas Jones, *Thomas Davies, *William Jones, *Joseph Owen, *James Protert, *Rees Jones.

METHLEY.—R. Hollings, J. Hollings, R. Smirthwaite, Dr. Wigin.

MIDDLETON-IN-STRANTON.—*Jno. Robson Reay, *Christopher Walker, jun., *Beniamin Wright.

MIDDLEWICH.—*Richard Barker, *William Boosey, Richard Henry Yeomans.

MIDGLEY.—James Alderson (the only person nominated).

MILVERTON.—*Godfrey Appleyard, *Charles James Bill, *James Collier Harter.

MOLD.—*H. Lloyd Jones, *William Evans, *G. H. Adams, *Dr. Thomas Williams, *John Hughes (since deceased).

MONK BRETTON.—Joseph Cheatter, John Coldwell, Robert Richardson.

MORLEY.—*John Hill, John Clegg, James Barker, John Dixon.

MOTTRAM-IN-LONGDENDALE.—*Thomas Halstead, *Joseph Oldham, *Isaac Shaw, *John Bernard Ledeboer.

MOUNTAIN ASH.—*William Prichard, William Lloyd Herbert, *Charles John Nixon Gray, Jabez Long, Davy Jones.

MUCH WENLOCK.—George Edward Meredith, *Thomas Adney, *Richard Cooper, *Captain Wayne, *Thomas Jukes.

NANTWICH.—*William Cooper, *Joseph Jackson, Seymour Hugh Munro.

NELSON.—Smith Hudson, William Hartley, John Wilkinson, Leonard Marsden.

NESTON AND PARKGATE.—*David Russell, M.D., Messrs. *Wyse, *Haigh, and *Thomas Lloyd.

NEWBOLD AND DUNSTON.—James Beatty, Charles Hancock, George Orwin, James Pearson.

NEWNHAM. C. A. Goold, William Headdon, William H. King, Henry Wellington.

NEWPORT (SALOP).—*D. Edwards, *M. Thompson (since resigned), *W. Wiggin, *R. Williams.

NEWTON HEATH. Robert Lancashire, John Blomeley, William Henry Holland.

NORMANBY.—R. Coverdale, John Harrison, T. Thomas, *Edward Upton.

NORMANTON.—H. Holmes, *John Pepper, Robt. Lawson.

NORTHALLERTON.—Samuel May, George Oliver, Nathaniel Russell, *Charles Waistell.

NORTHAM.—J. W. Cock, W. Pickard, Captain Wren, Oliver Heywood.

NORTH BIERLEY.—H. Breaks, L. Hill, R. Wilson, C. Bentley, James Sharp.

NORTHFLEET.—*James French, *Henry William Kirby, *William Robert Topham, Robert Williams, Alfred Wimble, Alexander Deakin, *George Blackmore.

NORTHWICH.—*George Slater, *John Woodyatt, *William Sutton, *William Dale, *William Newall, Thomas Moore; and Thomas Deakin by Board to fill up a casual vacancy.

NUNEATON.—*George Ward, Robert William Swinnerton, Jacob Stanley, Joseph Ward Knowles.

OKEHAMPTON.—*William Paddon, Samuel Pike, James Ward.

OPENSHAW.—Stanhope Perkins, John Swindells, J. H. Crosfield.

ORMESBY.—James Duffield, William Harrison, A. S. S. Keith, W. R. Thomas.

ORRELL.—*Thomas Alker, Joseph Lawrenson, John Warburton, *James Pickering.

OSWALDTWISTLE.—Robert Beckett, John Cunliffe, William Hoghton, John Haworth.

OTLEY.—Peter William Musgrave, Harvey Wharfedale Tennant Garnett, Richard Watkinson, *William Swift Greaves.

OTTERY ST. MARY.—John Brown, Matthew Ellis, *Samuel Warren.

PADIHAM AND HAPTON.—*James Potter, *Eli Whitehead, *Henry Ingham, William Lancaster, *Wilkinson Wilkinson.

PEMBERTON.—*Richard Clayton, *William France, *James Aspinall, *James Moss, Henry Moorfield.

PENISTONE.—John Armitage, *Arthur Cobden Jordan Wilson, Risdin Darracott Woodcock.

PENRITH.—Thomas Altham, George Hetherington, J. James, John Sarginson.

PHILLACK.—*John Thomas, *T. E. Hockin, *William Hosken, *W. E. Rosewarne, S. I. Rosewarne.

POULTON, BARE, AND TORRISHOLME.—*James Tetley, *Richard Crabtree, Jeremiah Jowett.

QUEENSBURY.—J. Waugh, J. Sherwin, J. Bairstow.

RADCLIFFE.—Walker Allen (Junior), James Ashworth, Joseph Brooks, John Heap.

RAMSGATE.—John Overy Eve, Charles Pearce, William Turpin, Lazarus Hart, David Erskine Dewar, Philip Sins Emett, William Frederick Pygott, Samuel Woodman, Rev. Edward Gripper Banks, Paul Maurice Upright, George Sykes, William Parlett Blackburn, John Lamy Ellerm (since deceased), John Barnet Hodgson, Lawrence William Vaile, Charles Robert Wood, Jacob Tritsch, Rev. John Bradford Whiting, Rev. Emile Cornet D'Auquier, Lewis Jefferis, James Frost, Henry James Wolfenden Johnstone, Richard Sale, William Shippey.

RASTRICK.—John Crossley, *J. R. Firth, John Kaye, Preston Hepworth.

REDDISH.—*Richard Furnival, *William Walmsley, *Frederick Whittaker Scott, *John Walthew.

REDDITCH.—*A. Booker, *J. W. Shrimpton, *W. H. English, J. Mogg, John Johnson.

RHYL.—E. D. Wynne Jones, Frederic Penn, Robert Oldfield, J. B. Linnell, P. Mostyn Williams, E. Vaughan, Thomas Ellis.

RICHMOND (SURREY).—James Burrington Bull, Edward Liveing Fenn, George Thomas Noyce, Somers Thomas Gascoyne, Francis Burdett, Arthur Brewin, Edward Carlile, John Warrington Morris, James Moore Lucas, John Maxwell.

RIPLEY.—*M. Rushforth, *J. T. Morley, *G. Webster, *J. Johnson.

RISCA.—*George William Wilkinson, *Cornelius Jones, Henry White.

ROMFORD.—*Thomas Bird, *W. H. Fox, *A. Harvey, *H. Whitmore.

ROWLEY REGIS.—*Thomas Penn, William Parkes, George Gilbert, *Joseph Hodgetts, William Williams, *Thomas Hurley Robertson.

ROXBY-CUM-RISBY.—*Charles Scoffin Holgate, *George Taylor.

RUGBY.—*Jonathan Packwood, Sidney John Dicksee, *Rev. Charles Elsee.

RUGELEY.—A. Whitworth, H. Brown, John Key, William Williams, George Burnell.

ST. NEOTS.—*George Bower, *Henry Harvey, *Rev. William Maule, *William Henry Hall.

ST. THOMAS.—*Mark Farrant, *Thomas Symons, *W. Cuthbertson.

SALE.—John Brown, *Henry Burgess, *John Fullalove, Thomas Kirkley, Francis Haslam Oldham.

SALTBURN-BY-THE-SEA.—J. C. Simpson, John Trotter, Joseph Walton.

SANDBACH.—James Broad, *James Davies, *Andrew Johnstone, James Lea, Jehu Vawdrey.

SANDGATE.—*Frederic Franklin, *Richard John Fynmore, *George Chapman Walton.

SEATON.—*H. A. Pattinson, *W. Gould, *E. W. Gush.

SEATON CAREW.—*Lazarus Bowser, Thomas Laing, *Jacob Lohden.

SEVENOAKS.—*Rev. J. Jackson, *J. Moore (Junior), *E. H. Stepney, *C. Waterhouse, *H. Thompson.

SHERNESS.—*J. T. French, J. Peters, *H. T. Penney, *J. Copland.

SHELLEY.—*Joseph Townend, *Sidney Battey, *John Mitchell.

SHEPLEY.—*James Senior, *Reuben Senior, *Joshua Wood.

SHEPTON MALLET.—*George Mackenzie Mackay, *William Luff, *James Allen.

SHERBORNE.—Charles Leftwich Oldfeld Bartlett, Captain Fife, Rev. John Blanch, William Seymour.

SHIPLEY.—Samuel Barber, Tom Townsend, Jonathan Learoyd Miles Rhodes; and Edmund Pullan to fill a casual vacancy.

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SIDMOUTH. -*William Trump, *Francis Henry Pyle, *John Harris.

SKELMANTHORPE.—*Edwin Field, *Samuel Field, Henry Augustine Whittall.

SKELMERSDALE.—*James Taylor, *John Aspinwall, *Thomas Aspinwall, *Richard Latham, William Beveridge; and Richard Mercer by the Board to fill a casual vacancy.

SLEAFORD, NEW.—*James Hubbard, *W. D. C. Owen, *Edward J. Brewitt, Alfred Darlow.

SLOUGH.—J. H. Spokes, Sir T. D. Forsyth, J. Lundy, R. Martin.

SMETHWICK.—Walter Harley, John Newey, Thomas Howell, Wm. Weaver Vaughan.

SOOTHILL NETHER.—*Alexander Lee, senior, *Thomas Hanson, Abraham Tonge.

SOOTHILL UPPER.—*Wm. Parker, John Clarkson, Anthony Spurr.

SOUTH BLYTH.—*Robert Bell, *Jacob Keenlyside, Edwin Saunders, Benjamin Milburn, John Watson (the three last are for the newly annexed or South ward).

SOUTHBOROUGH.—John Bromwich, James Readman Coles, William Kirby.

SOUTH CAVE AND WALLINGFEN.—*John Rudd, William Tindale, Henry Shaw, *Thomas Moverley.

SOUTH CROSLAND.—*Thomas Brooke, J.P., *Albert Wrigley, *Samuel Pontefract.

SOUTHEND.—*J. B. Brasier, J. R. Hemmann, W. L. Wise, *D. W. Gosset.

SOUTH GOSFORTH. — *Richard Welford, *Thomas Adamson, *Thomas Bainbridge; and John Robinson, to fill a casual vacancy.

SOUTH HORNSEY.—*Charles Handley, *James Harper, *Christopher Birmingham Melluish, *Thomas Perman.

SOUTHOWRAM.—Messrs. *Barstow, *Barber, and *Morton.

SOUTHWICK. R. C. Hudson, W. Dawson, W. D. Pratt.

SOWERBY.—*Josiah Haighley, *George Lumb, Jno. Selwyn Rawson, *Gibson Pickles, Shepherd Wilson, *Richard Hodgson; and Wm. Greenwood, elected by the Board to fill a casual vacancy.

SPENNYMOOR.—Thomas Wilkinson, *Thomas Farthing, *Thomas W. Starforth.

STAINES.—*Richard Ashby, *Frederic Barrett, Walter B. Puckle, Herbert Rymill.

STAINLAND WITH OLD LINDLEY.—James Haigh, George Norcliffe, John Quarmby.

STANHOPE.—*Thomas Livingston, M.D., *Daniel McAllam, *Wm. Rippon, *Charles Emerson.

STAPLETON.—George Thomas, *Joseph Haskins Ball, *Jacob Monks, Thomas William Stone.

STEVENAGE.—*John Warner Smith, H. Matthews, T. F. Warren, E. Muncey, H. Ivory.

STOKE.—Astley Edward Lindsay Kaye, John Kendrick, JohnSmith.

STOWMARKET.—John Crowe, John Gosling, Edward Salmon; and H. A. Oakes and John Hayward, to fill casual vacancies.

STOW-ON-THE-WOLD.—*Thomas Roff, *Henry Sutton, *William Biddulph Greaves Tasker.

STREET.—*James Clark, *Robert Talbot, Francis Petirn.

SURBITON.—W. Y. Cockburn, J.P., E. L. Thynne, W. Parkes, W. Mudie, E. E. Blake.

SUTTON BRIDGE.—*Michael Richard Thorold, *John George Hobson, John Richard Clarke.

SUTTON-IN-ASHFIELD.—H. Shaw, W. Brooks, T. Briggs, M. Fox, A. H. Bonser; and Job Shelton to fill a casual vacancy.

SWADLINCOTE.—Thomas Stacey, *Edmund Sharpe, *Robert Staley.

SWAFFHAM.—*Thomas Lindsey, *Robert Smith, *James Fuller, John Smith.

SWINTON.—Joseph Aquila Bower, *Enoch Jagger, John Carr, James Oxley.

TEDDINGTON.—*Robert John Tozer, *William George Taylor, *Richard Lardner, Edwin George Ive, William George Collier.

TEIGNMOUTH.—Messrs. Devonshire, Flamank, Slocombe, Parson, and Harris.

THAME.—Messrs. *F. Abbott, Lacey, *J. J. Shrimpton, J. W. Marsh, and Dr. Lee.

THORNHILL.—*John Beatson, *John Fisher, *William Hodgson, Thomas Turner, Robert Machell, Benjamin Crowsher, William Henry Romsden.

THURLSTONE.—*John Hinchcliffe, *William Hoyland, *William Smith, *Richard Turner.

TIPTON.—Thomas Downes, J. Stanton, J. Bailey, G. Thomas, W. Fisher, *William Allen, *John James.

TONBRIDGE.—*G. Dadson, *B. Payne, *R. Stagg, *F. T. Bridger, *W. Baldwin, *J. C. Rice.

TONG.—Abraham Elsworth, Thomas Horsman, *Edward Croft.

TOTTENHAM.—*Thomas Biscoe, Joshua Pedley, *John Wilson, *Henry Moore.

TOWYN.—Rowland Gwynn Price, Richard Jones, *William Lloyd, *John Daniel.

TOW LAW.—Joseph Bond, William Ridley, Joshua William Schofield.

TREDEGAR.—*David Price, *Charles Widdowson, Walter Taylor, *William Davies, John Thomas.

TROWBRIDGE.—Joseph Poynton Haden, John Kemp, William Honey Haywood, Jacob Usher, Ephraim Usher, George Mayris Sylvester, George Lleweilen Palmer.

TUNBRIDGE WELLS.—*W. F. Browell, *R. Howard, *J. A. Robb, *Apsley Smith, D'Aubigny Hatch, *W. J. Biggs, *R. Boorman, Captain O. F. Timins.

TWICKENHAM.—William Begent, Francis Freshwater, Thomas George Gardiner, John Nash Goatly, John Kebell Gwyn, Alfred Little, Thomas Joseph Messom, G. A. Powell, Charles Thrupp.

ULVERSTON.—William Settle, *James Nelson, *Joseph Taylor, *Edmund George Tosh, Frederick James Blacklock, James Harrison Simon.

UPPERTHONG.—*Benjamin Butterworth, William Berry, John Hirst Hampshire, Joshua Woodhead.

WALKER.—*Charles Mitchell, Jesmond Towers, William Dobson, James Angus, *Dr. Aitchison, the Rev. M. T. Bourke.

WALLASEY.—*James Currie, J. H. Walker, *F. Johnston, *E. Davies.

WALLSEND.—George Awburn Allan, James Wm. Dees, Wm. Hall, Wardle Shaw.

WALMER.—Thomas Coleman, George Marley, John William Webb, James Macintosh, Alexander Tod, Stephen Hinds.

WALTHAM HOLY CROSS.—*Samuel Tyler, Ernest Champness, *Peter Mills, *Charles Chapman.

WALTHAMSTOW.—John James Burgess, James William Calver, William Alexander Longmore, William Meakin, *Walter Basden Whittingham.

WALTON-ON-THE-HILL.—*Joseph Glover, *Christopher Grimshaw, Joseph Atherton.

WAREHAM.—Frederick Marshallsay, J. B. Best, R. C. Hutchings.

WARLEY.—*Henry Patchett, Thomas Crowther, *Oates Binns, Thos. Mitchell.

WATFORD.—*John Crouch Binyon, *Francis Henry Wilson Iles, M.D., Alfred J. Copeland, *James Pratt.

WAVERTREE.—*Sir James Allanson Picton, J.P., G. C. Barker, Isaac B. Dilworth, *William Pinnington.

WEDNESBURY.—Joseph Trow, Edward Hobbins Smith, Joseph Whitehouse, Francis Dicken.

WEDNESFIELD.—J. W. Done, *Charles Hadley, Isaiah Hill, *Henry Bellamy, James Snape.

WELLS (NORFOLK).—The election of this Board is held in October.

WESTBURY-ON-SEVERN.—Maynard W. C. Wemyss, B. Mayo, James Hall, Miles Hart.

WEST COWES.—*George Fellows, sen., George Fellows, jun., *Henry Samuel Hansen, *Waller Hillyer, *Edwin White.

WEST DERBY.—Roger Parker, Ernest Laremont Fleming, Nicholas Smith Glazebrook, William Callaghan, John Wilkes Wood, Richard Crosby, William Craze, John Snow McKinnon.

WEST HAM.—*George Jones, James Maw, George Hay, *Frederic Smith, Evan Prosser, *James Scully.

WEST HARTLEPOOL.—*Francis English, *Matthew Gray, *John Brown, *Charles T. Casebourne, Thomas Clarkson.

WHEATLEY.—*Richard Rose, *John Fowler, Rev. Edwin Bird.

WHITCHURCH and DODINGTON.—*Edward Lea, Henry Williams, William Ledsham.

WHITEFIELD.—John James Mellor, Isaac Jackson, Alfred Templer, Mark Hardman.

WHITTINGTON.—Reuben Ault, Dr. Ambrose Myrie Palmer, George Dawes.

WHITWICK.—William Bernard Beckworth, James Maloney, Moses Burton, William Sheffield.

WIDNES.—*D. Forster, J. Houghton, B. Dutton, *F. H. Pankhurst, *Dr. O'Keiffe.

WIGTON.—James Aird, Joseph Pearson, Leonard Potts, Robert Twentyman.

WILLENHALL.—*Isaac Pedley, *Jesse Tildesley, *Henry Wolverson, *Jonah Banks, George Taylor.

WILLINGTON.—*Charles Ernest Bell, *Robert Llewellyn Weeks, *William Rutter.

WILMSLOW.—*Andrew Pearson, *Thomas Alcock, Ralph Bower, Robert Lindop Bourne.

WILSDEN.—Michael Pickles, Thomas Lund, William Moulding, John Booth.

WIMBLEDON.—*George Chatterton, M.A., C.E., *Colonel Cole, *J. G. A. Diggens, Edward Little, M.D., *J. P. Mellin, *John Townsend.

WINDERMERE.—*John Airey, *Archibald Hamilton, M.D., *Edward Deason.

WIRKSWORTH.—J. Webster, W. Wardman, J. Marsh.

WITHAM.—*William Bindon Blood, *Thomas Hoffgaard Shoobridge, *William Butler.

WIVELISCOMBE.—*William Hancock, *Robert King Cross, *Albert Richard Balman; and P. D. Hawker to fill a casual vacancy.

WOLBOROUGH.—Josias Crocker, James Robert Cull, James Snelling Bearne, Hugh Mills, John William Ley.

WORKSOP.—Charles Tylden Wright, Joel Haslam, William Josiah Moore.

WORTHING.—Henry James Berry, James Lee Carpenter, *William John Harris, *George Jonathan Mills, *William W. Smith, Robert Piper, James Wythe.

WROTHAM.—*Walter Monckton, *Thomas Golding, *Joseph Walls.

WUERDLE AND WARDLE.—Robert Royds, Robert Healey, Robert Stott.

YEADON.—John Hey, Benjamin Lees, William Brown.

* Retiring members re-elected.

SANITARY INSTITUTE OF GREAT BRITAIN.

EXAMINATION OF SURVEYORS. JUNE 7, 1883.

Paper I.—The following questions were set for this examination:—1. What are the main provisions of the Rivers Pollution Act? 2. Give the substance of the model bye-laws for regulating:—(*a*) Cleansing of footways and pavements; (*b*) Removal of house refuse; (*c*) Cleansing of earth closets, privies, ashpits, and cesspools. 3. Why ought sewers to be ventilated? What circumstances favour the formation of foul gases in sewers? and how can new sewers be constructed so as to prevent or greatly reduce the formation of such gases? 4-

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What is meant by disconnecting a house drain from the sewer? Describe what adjuncts are necessary, and what arrangements should be made for ventilation. Give a sketch of any two disconnecting arrangements. 5. Describe the arrangements you would adopt in a town situated on the side of a hill to prevent the lower districts being flooded, or the upper districts being injured by foul gases from the sewers. 6. Explain the following processes for purifying sewage, and describe the mode of action in each case:—(*a*) The lime and one other precipitation process; (*b*) The irrigation of land. How would you lay out the land for a sewage farm, selecting your own conditions of situation and soil?

Paper 2.—1. Explain what is meant by 'constant' and by 'intermittent' water supply. What are the advantages and disadvantages of each? What precautions are necessary in each case to prevent the water becoming polluted inside a house—(*a*) With cisterns; (*b*) Without cisterns? 2. Mention the quantity of water supplied per head per diem in any four large towns in England. How much of this has probably been used for domestic purposes, how much for town and manufacturing purposes, and how much has run to waste? How is the amount of waste ascertained and remedied? 3. Give a description and sketch of an ordinary rain gauge. Mention the points to be observed in fixing it in order to obtain a correct record of the amount of rainfall. Is it a good plan to place a rain gauge on the top of a house or of a wall? State the reasons for your opinion. What is the annual amount of rainfall in some of the localities with which you are acquainted? 4. Describe systems of ventilation that you would consider efficient for—(*a*) A church; (*b*) A dwelling house. 5. Give the definition of a cellar dwelling. Under what conditions does the Act allow it to be occupied? State the most common causes of dampness in basement rooms, and what remedies you would suggest in each case. 6. Describe the various methods of laying wood pavement. Give an explanatory sketch, and state the advantages of and objections to wood pavement.

Examination of Inspectors of Nuisances, June 7, 1883.

1. State the provisions of the law with reference to common lodging houses. 2. How does the Public Health Act define a nuisance? If you find a nuisance to exist on any premises what steps would you take? 3. How much cubic space would you recommend per person in a sleeping room? 4. Describe a simple but efficient plan of ventilation for a cottage of four rooms. 5. What steps would you take if a well in a village were reported to be polluted? How may water be polluted within a dwelling? 6. What are the objections which are inseparable from cesspools? 7. How can the access of sewer air to houses be prevented? 8. In what way would you proceed to disinfect clothing after a case of infectious disease? What powers have you to disinfect rooms? Describe the methods that you would adopt.

QUESTIONS IN THE PLUMBING COURSE OF THE NEW YORK TRADE SCHOOLS.

The following questions which are set for the pupils of the New York Trade Schools on the subject of trapping and ventilating soil-pipes are reproduced from the *Sanitary Engineer*:—

1. What is the object of a trap?
2. How is this effected?
3. Is this an effectual remedy?
4. Will the water in a trap absorb gas and emit it again?
5. How is this difficulty overcome?
6. Where should the open end of a pipe be situated, and how is the pipe usually terminated?
7. What is the object of the trap required by the Board of Health where the soil pipe enters the house?
8. Is there any other theory on this point?
9. What is the theory of the Board of Health in regard to this trap?
10. What causes a pressure from the sewers on the main trap?
11. Can the difference in temperature between the air in a sewer and in a soil pipe unseal a trap?
12. Will open fires cause a suction on soil pipes, and why?
13. What is the best form of a trap at the outlet of a soil pipe, and of what material should it be?
14. Why is the momentum of a column of water not likely to carry it through a trap and leave the trap unsealed?
15. What is the effect of a column of water passing through a pipe and completely filling it?
16. Why will a vacuum suck the water out of traps?
17. What is the pressure of the atmosphere on a vacuum?
18. How is this suction prevented?
19. Can a vacuum be created in a pipe when it is only partly filled with water?
20. The Board of Health requires a 4-inch pipe to extend from the outer air to a point just inside the trap by the exterior wall; what is the object of that pipe?
21. Why does the air enter by this pipe and pass out at the top of the soil-pipe?
22. Why does warm air ascend?
23. Can a rush of water through the soil-pipe affect this ventilating pipe, and should any precaution be taken in regard to it?
24. Is it a good plan to run a soil-pipe in a flue, and why not?
25. How deep should the water-seal be in a running trap?
26. Is there any objection to a deep trap?
27. What is an air lock?
28. How does it affect the passage of water?

NOTES AND QUERIES.

Having for some time back been in the receipt of Queries appertaining strictly to sanitary work, and which it would be easy to answer without having to refer our correspondent to competent professional advisers, we have opened a column in which to register such Queries and Replies thereto as can fairly be expected from us; and our subscribers and readers are invited to make such use of this column as will tend to benefit themselves and the community. Both Queries and Replies will, however, be subjected, if unnecessarily long, to a strict curtailment.

95. Powers of Entry in Case of Overcrowding.

It is whispered by neighbours that the occupier of a cottage allows a large number of people to shelter with him through the night. By what means can the Nuisance Inspector legally enter and examine the house during the night to see as to overcrowding? I. S.

[The inspector has no such power. Sect. 91 of the Public Health Act defines as a nuisance 'any house or part of a house so overcrowded as to be dangerous or injurious to the health of the inmates, whether or not members of the same family:' but the powers of entry by the sanitary officers for the purpose of examining as to the existence of any nuisance can only be exercised between the hours of 9 A.M. and 6 P.M. (Sect. 105 of the Act).]

96. The Disinfection of Public Conveyances.

I shall feel greatly obliged if you or any of my fellow-readers of the Sanitary Record will reply to the following question:—Section 127 of the P.H. Act, 1875, provides that every owner or driver of a public conveyance shall immediately provide for the disinfection of such conveyance after it has to his knowledge conveyed any person suffering from a dangerous infectious disorder; and if he fails to do so renders himself liable to a penalty of 5*l*. I have had a case in my district where the dead body of a child, which died from a severe attack of scarlet fever, was conveyed for funeral in a mourning coach, in which sat mourners; and as I think it desirable in such a case to disinfect such coach, I shall feel obliged to you for a reply. I may say that the undertaker refuses to give me the name of the owner or driver of the coach.—A.T.

[You ask for reply to a question which you do not put. But if your object be to learn what powers of disinfection you possess in the case of a mourning coach which has contained the (presumably coffined) body of a scarlet fever patient, I would reply that you do not seem to have any power in the matter.—Ed. S.R.]

97. Nuisance from Cows on Footpaths.

Is there, in the absence of a bye-law, no 'general' law to meet the nuisance of cows, &c., straying on footpaths and rendering them impassable—firstly, by obstruction; secondly, by dropping their filth on them? Asphalte.

[Apparently not. The only section likely to help is Sect. 49 of the Public Health Act, which provides that when *in any urban district* it appears to the inspector of nuisances that any accumulation of manure, dung, soil, or filth, or other offensive or noxious matter ought to be removed, he shall give notice to the person to whom the same belongs, or to the occupier of the premises whereon it exists, to remove the same.]

98. Analysis of Water by M. O. H.

Can you inform me whether the analysis of water forms part of the duty of an ordinary medical officer of health, or is it an extra for which he can charge? P. S. H. T.

[See the answer to a similar inquiry in Vol. X., p. 285. The analysis of water is not one of the duties specifically imposed upon officers of health by the order of the Local Government Board. If a quantitative analysis is required, the sanitary authority ought to procure it from an analytical chemist; but as the official order provides that the medical officer of health shall 'inform himself as far as practicable respecting all influences affecting or threatening to affect injuriously the public health of his district,' the health officer can hardly fulfil that requirement satisfactorily unless he makes himself acquainted with the general character of the water supplies. To do this, he must not only observe the physical conditions and surroundings of the wells or other sources of supply, but must also be prepared to use, where necessary, the ordinary chemical tests of the purity or otherwise of the water. If, however, the sanitary authority desire a detailed quantitative analysis to be made by the medical officer of health, they must undoubtedly pay for it as an extra.]

CORRECTION.

By a printer's error in our report of the National Health Society's Exhibition of Hygienic Dress, &c., at Humphreys' Hall, Knightsbridge; Hamilton & Co.'s name, as exhibitors of combination garments, appears to be bracketed with that of Mrs. Bauer, of 134 Oxford Street. We have great pleasure in complying with Mrs. Bauer's request that we should correct this inaccuracy, and state that the two firms are not in any way connected, and that Mrs. Bauer introduced the combination garments many years before Hamilton & Co. commenced business, and was, in fact, the inventor of this improved form of ladies' underclothing.

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ORIGINAL PAPERS.

ON THE PROBABILITY OF AN INVASION OF CHOLERA IN EUROPE.*

By Privy Councillor Dr. MAX VON PETTENKOFER.†

SINCE cholera has begun to show its Medusa-like head in some of the Egyptian towns, the danger of its spread to Europe has become apparent. Nothing is more natural than that the different States of Europe should ask themselves what can be done for the protection of their populations. For Munich this year the cholera question is one of the highest importance in connection with the International Art Exhibition, which is attracting visitors from all parts of the world. But even if cholera should find a footing this summer or autumn on the coasts of the Mediterranean or Black Seas, it will hardly find its way to Munich.

Although the origin of cholera is still very obscure in some points, investigation has nevertheless established certain fundamental facts that do not admit of doubt. Cholera in its epidemic form does not depend solely upon a disease poison (or, as we may say, upon a yet undiscovered cholera organism), which is conveyed through human intercourse, but also upon the receptiveness of the locality to which this cholera germ is brought. There are places, and even large cities, which have always successfully withstood the epidemic influence of cholera, even although individual cases have been from time to time introduced. We may cite as examples in our own near neighbourhood the cities of Stuttgardt, Salzburg, Innsbruck, &c.; and in France, Lyons and Versailles. Such places are said to enjoy immunity from cholera. But even places which do not enjoy complete immunity may do so at certain times; that is, they are not always victims of a cholera invasion when such invasion is possible. Munich, for example, has suffered only three times from cholera since the disease became known in Europe—viz., in 1836–7, 1854, and 1873–4—whereas Berlin has suffered on every occasion. There is also not only a local but a seasonal susceptibility for cholera as well.

In its permanent home in India the disease does not act differently, for there more than a thousand years' experience has shown that it has its seat not in men themselves or in any particular class, but in particular localities of India, in Lower Bengal, from which it spreads only occasionally through the rest of India, and only to such places as are proper for its propagation, by reason of the indispensable susceptibility of locality or season. Even the permanent or endemic seats of the disease are not at all times equally dangerous; for instance, in Calcutta itself there may be one year only a couple of hundred cases, whilst in another they may be counted by thousands. Even the seasons of the year show very marked differences, so that on the average the greatest number of cases occur in the hot and dry period (March and April), and the fewest during the hot and wet season (July and August).

That human intercourse must have a strong influence upon the spread of the cholera germs from cholera localities is self-evident: the endemic cholera of India began to spread to other countries as soon as intercourse became more rapid by the increase in the rapidity of the means of transit (the first steamer made its appearance in Indian waters in 1823): before we had communication with India we had no cholera. But it is a grave error, as is proved by the recent observations in India ('Reports of the Sanitary Commissioner, Dr. Cuningham, from 1868 to 1881'), to assume that those sick of cholera form the only, or even the chief, starting points in the spread of the disease. Attendants upon cholera patients are usually remarkably free from it. Cholera infection starts from a cholera locality and not from cholera patients.

As an argument against the correctness of this view, outbreaks of cholera on board ship are sometimes cited, but, so soon as we investigate more closely the occurrence of cholera on board ship, we must be convinced that ships are in the category of localities which, as a rule, enjoy immunity from the disease. It is a rule among seamen, grounded on long experience, that if cholera cases break out among the crew of a ship lying in an infected port, intercourse with the shore should be immediately broken off, and that the ship should sail for the open sea with both sick and well on board, under which circumstances the disease, as a rule, rapidly ceases. Sickness of longer duration, or epidemic outbreaks on the high seas, are rare and isolated phenomena; but when they do take place they make a great noise and are reported in all the papers. But people forget to ask how many other ships have left the same port and sailed the same course, and how many cases they had. When this question is put and answered, we have generally reason to be surprised at the immunity that ships at sea enjoy. For example, the lines of steamers between Calcutta and Mauritius and between Europe and New York have been carefully inquired into. An example from the latter may be here given. According to the lists of the Emigration and Harbour Board of New York, there travelled in 1873 on board ships which carried emigrants not less than 316,956 persons in 760 voyages from different parts of the world, of whom 266,055 came from Europe; and of these 113,920 came from England, and 152,135 from the rest of Europe. As England was free from cholera in that year, we shall reckon only the 152,135 from the Continent as coming from cholera localities. What, then, was the number of cholera cases ascertained to have occurred on board about 400 ships, carrying 152,135 persons to America from cholera-tainted districts in Europe? Cholera occurred on board only four ships in all, the total number of cases being 100.

1. A ship sailed from Hamburg on August 27, and landed at New York on September 10, with nine cholera cases on board, of whom two died in quarantine; and there were besides two deaths on the voyage, the bodies being thrown overboard. All the eleven cases belonged to two German families, who appear to have gone on board with the disease among them. Among the other passengers, more than 300, there was not a single case.

2. A steamer sailed from Havre on September 12, and on the 16th lost a man, whose body was thrown overboard. She reached New York on the 24th of the month without any other cases occurring.

3. On October 6 a steamer left Stettin with 298 passengers. On October 21 she had three fatal

* From *Neueste Nachrichten und Münchener Anzeiger*, July 14, 15, and 17, 1883.

† For this summary of Professor Pettenkofer's important and interesting paper we are indebted to the kindness of Professor de Chaumont, F.R.S.

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garrisons were embarked
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camp. Several days after
out, and many fell victims to
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among those from the barracks or
company. In the Indian trans-
frequently observed that the
out among the crews, whilst the
remained free from disease, or *vice*
depending upon where the men
They must either have embarked
or have brought with them a cer-
of infective material in some shape or
transport immature cholera germs
localities, but in order that the germ
and become infectious it must be first
brought to land, when its power depends upon
place and season already referred to.
germ is a much longer time in being brought
on account of the length of the voyage, for
it generally dies out; hence, in spite of the
amount of intercourse by sea between
England and India, cholera has never been thus intro-
duced direct into England, nor even into the Cape
of Good Hope or Australia, which have never suf-
fered from cholera. England has always received
it through the continent of Europe.*

The Spread of Cholera.

However certain the influence of human intercourse upon the spread of cholera may be proved to be, we must nevertheless be careful not to overestimate it, or to look upon it as the *only* necessary condition.

When the means of communication in India itself became greatly increased by the establishment and development of railways, it was thought that a very considerable change in the rate and direction of spread of cholera would be observable; but as it has turned out the new conditions have not produced any material change. The same thing has been observed among ourselves in Europe. In Germany, for instance, there is no country so thickly populated and so cut up by railways as Saxony. Since 1836 cholera has appeared there in *eleven* different years, but—according to the official reports of Günther and Reinhard—its spread has not been in any way influenced by the lines of railway. The same places were always the sites of cholera, whilst others remained protected in spite of the railways. In Saxony it was also shown that the epidemic development of cholera took place only at certain times. Every year of severe epidemic was preceded by one of slighter invasion. Thus, in 1849 there died 488, and in 1850, 1551; in 1865, 358, and in 1866, 6,731; in 1872, 4, and in 1873, 365.

That the cholera germ need not necessarily become active at once, when it is sown in a locality, we had good occasion to see in the visitation at Munich itself in 1873, when the epidemic was divided into two parts, a summer and a winter outbreak. Munich lies on three terraces on the left bank of the Isar. The summer outbreak was almost entirely limited to the two higher terraces, whilst in the lowest there were at most a few sporadic cases. The summer outbreak, like that of 1854, showed itself in the beginning of August with a few cases, but it disappeared entirely towards the end of October, to reappear again with greater severity in November, when the district which suffered most was the lowest lying terrace which the winter outbreak had spared. If, however, we admit, as indeed we must, that the disease arose from intercourse between Vienna and Munich, then the cholera germ must have been introduced from the upper to the lowest terrace in August, and from the Turkish barracks * to the Isar barracks, where the disease appeared for the first time in November, after a lapse of three months.

These facts, which are incontestable, are too little regarded in this time of possible cholera invasion, both by the public and by the authorities, who seem to think that the only possible prophylactic measure is, either to arrest the cholera poison in its way hither or to destroy it by disinfection. We cannot deny that such steps would be effectual against cholera if it were possible to carry them out, but are we prepared to prohibit all intercourse with everything and everybody that might bring the cholera germ? Most people believe that it is only the sick, and what may have touched them or been in their neighbourhood, that are capable of conveying the germ, but that is an error. The quarantines and military cordons again proposed at the present time can only take the sick as the starting and closing points, and they will no more succeed in arresting the disease than the quarantines and cordons of the year 1830, with which cholera was received on its first appearance in Europe in the present century. On account of their uselessness and their cost they were given up, but people are still quite prepared to begin with them again. Efforts are being made especially in France in that direction, but however details may be altered or new disinfectants be used, it is exceedingly doubtful if any better success will attend them than before. It may indeed be said that by means of quarantines and cordons, if they are sufficiently multiplied, a certain amount of cholera poison will be arrested and destroyed; that, in short, their effect will be much the same as a good preventive service against smuggling—for even, if it does not entirely prevent smuggling, it certainly

* Except in 1866 when it appeared to reach Southampton by sea from Gibraltar. (Translator).

* The name of barracks in Munich, built in former days by Turkish prisoners. (Translator.)

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limits it very considerably. It must not be forgotten, however, that there is a vast difference between articles of merchandise and cholera germs. If a single ox, for instance, is smuggled in, it remains a single ox, and does not immediately develop into a whole herd on the other side of the boundary line. But if a single bacterium gets through in an appropriate medium for its nourishment, it has the power to increase million and billion-fold in the shortest space of time. If a smuggled ox or a smuggled bale of merchandise could immediately increase into a herd or into a warehouse so soon as they passed the revenue boundary, then the preventive service would never have been established, or would long ago have been recognised as useless.

We can imagine no better quarantine than that which was established at Malta against the cholera in 1865. That small island, so favourably situated for guarding against all intercourse from without, hoped to be successful in preventing the entrance of cholera. From the moment that cholera was telegraphed from Alexandria, every vessel from Egypt was put in quarantine in a small island (Fort Manöel) in the harbour. None of the Maltese who had intercourse with the ships that arrived—such as men who helped to coal the vessels—were allowed to return to their homes, but were obliged to remain in the lazzaretto. But in a few days cholera broke out in various places throughout the island, just as it had done before, no more and no less, although those places had had no intercourse with the quarantined ships, people, or goods. Quarantines and cordons, to be useful, ought to be in constant operation, just as cholera is constant in India, from which it can be introduced every year. If we could by stringent regulations reduce or delay intercourse with India until it was diminished to the rates of communication of the last century, then cholera would no longer reach Europe. But in order to break through such cordons we should have bloody wars, which would cost more lives than those lost by cholera—lives, too, of the most valuable and productive ages, whereas cholera chiefly carries off the weak. If we begin with those stringent regulations only when cholera declares itself in Egypt or in Russia, then shall we always be too late. The same intercourse which in 1865 had brought the cholera poison to Alexandria, had also already brought it to Malta before any epidemic broke out in Alexandria, and in Malta it developed itself a few weeks later, but in any case earlier than the arrival of any cholera cases from Alexandria itself. This year it is the same as in 1865. The English have now proved that the cholera in Damietta could under no circumstances have arisen from cholera cases introduced with the Indian troops, and in that they are right; but they are wrong in their inference therefrom, viz., that the cholera was not brought from India, but arose spontaneously in Egypt itself. The cholera germ could perfectly easily have been introduced in the previous autumn or winter, without causing cases of sickness; and it no doubt found this year for the first time at Damietta the suitable soil and other conditions for developing its infectious force. That cholera germs may lie dormant for a long time in a locality, and then develop to infective activity after many months, is proved not only by the periodic march of epidemics in the endemic districts of India, but also out of India, too. The disease has often been observed to lie by during the winter in Russia or in East Prussia. Pistor, who has carefully followed the course of the cholera in the district of Oppeln from 1831 to 1874, points out that already in 1831 the disease continued till the beginning of winter and then stopped entirely, to reappear again in 1832, in July, August, or September, without any fresh importations being proved. If cholera germs can lie so long dormant after having given signs of life, so must we admit they can lie dormant a considerable time before giving visible signs of life at all. This explains, also, cases of explosion of local epidemics without any recent importations being proved, as well as cases where the introduction of the disease and the outbreak seem to be almost simultaneous. In Egypt cholera has usually begun in June or July, and neither there nor in Malta has it shown itself in winter. Compared with 1865, the cholera this year in Egypt is good two weeks later. Sometimes the cholera localities in Egypt and the Mediterranean are in a favourable condition for its development as regards season, and they will have cholera in spite of all quarantine; but if they are not in this condition they will remain free even if cholera cases should be actually introduced.

The Prevention of Cholera.

Most men, and many physicians, think still that if quarantine and stringent regulations, disinfection and isolation of the sick are useless, then nothing can be done against the spread of cholera; but when the danger is obviously threatening we cannot remain quiet with our hands in our pockets. People can still do much in the contagionist direction, and even quiet the minds of a good many people, but all efforts in this direction will be of no avail. From our standpoint of localistic influence we must turn in another direction for rules and adopt another kind of activity, which will, indeed, be just as ineffectual as quarantine in stopping the *spread* of the cholera poison, but which will operate upon the topical and seasonal tendency to disease in our places of habitation, and assist in converting, not indeed at once, but gradually, our soil susceptible to disease into one which will enjoy immunity therefrom. For this we must have *cleanliness in person, house, yard, and street*, especially by means of careful and regular removal of all foul waters from our dwelling-places, which waters are at the present time so constantly sent direct from our dwelling-houses into the soil we dwell upon, there to form appropriate nourishment for lower forms of life. That the seasonal tendency to cholera has something to do with the water in the soil, and particularly with its fluctuations, has been distinctly shown in the three epidemics at Munich, as well as in its own endemic home. Cholera in Munich has always occurred after a high ground-water level in the driest months, and in Calcutta on an average of thirty years the cases in the wettest month, namely, August, towards the end of the rainy season, have been *seven* times less than those of the driest month, April. A good water-service, efficient drainage, and the abolition of all cess-pits (or dead-wells), even those for the reception of rain-water, are prime necessities. Thoroughly good drainage, by immediate removal of all dirty water, deprives all organic life in the house or soil of nourishment for any lower organisms, to which class the cholera germ certainly belongs. Impure soil soon purifies itself, if man will only cease pour-

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ing fresh impurities into it. In a pure soil the ground-water may fluctuate as it pleases without doing any harm. In measures such as these lies our best protection against cholera and all other diseases which have anything to do with the soil.

Examples of this of a striking character are already known. In England, by the advice of Mr. Simon, the advent of the severe outbreaks of cholera in 1848 and 1854 was met, not by quarantine, but by the most strenuous endeavours to improve the water-supply and drainage all over the country. The result was that, although cholera reached England in 1865, it passed but lightly over it, and in 1872-74 there was not a single case, in spite of the most constant communication with the infected Continent. The city of Dantzig had always been until recently a true cholera nest, whenever the disease came into its neighbourhood. In the beginning of 1870, under the energetic management of its mayor, von Winter, the new water-supply and drainage system after the English model was completed. In 1873 cholera attacked the suburbs (Neufahrwasser, Henbude) with its usual severity, but this time the city itself escaped with 160 cases, whereas previously they had been counted by thousands.

We in Munich are, I think, entitled to regard the further development of cholera in Egypt, and even, it may be, in Southern Europe, with equanimity, and that on several grounds. The history of cholera teaches us that it has never yet reached Bavaria suddenly, without stages of outbreak on the way. In 1865, when it was so severe on the shores of the Mediterranean, it never reached Munich. Since then our local hygienic arrangements have been greatly improved. These improvements date from the experiences which we obtained in the epidemic of 1852, which was also an exhibition year, and they had a very favourable influence in modifying the invasion of 1873-74. In 1836-37 there died, out of 84,734 inhabitants, 802 persons, equal to 0·94 per cent.; in 1854 there died 2,223 out of a population of 106,715, or 2·08 per cent.; and in 1873-74, when we had two outbreaks, a summer and a winter one, there were 1,466 deaths out of 186,000 inhabitants, or 0·71 per cent. The new water-service in Munich is excellent, both as to quantity and quality, and the delivery to individual houses is now completed. Our drainage system advances rather slowly, but steadily, and the local authorities will doubtless take steps to accelerate it.

As things are at present, even if Munich were without water-supply and drainage, it would not be likely at present to suffer from cholera, for the moisture of the soil, which can be best measured by the ground-water, is at present as high as in 1866, when Munich was threatened by numerous epidemics in Germany and Austro-Hungary, and when the disease was much nearer us than at present. In that year of war there doubtless came to Munich many cholera germs by the medium both of persons and of all other possible things from cholera localities at no great distance. The police-surgeon noted in his journal only nine cases, of which two were fatal, but the city, as a whole, remained free from cholera. Unless we have this year in the coming autumn and winter a long-continued drought, we need have no fear of cholera next year.

Munich certainly does not belong to that class of localities which are severely visited by cholera. The interval between the two first invasions was seventeen years, from 1837 to 1854; that between the second two, nineteen years, from 1854 to 1873. Our hope is, therefore, not groundless that we may remain exempt till 1890. And even should it attack us, in spite of everything, we must ever strive to provide it with a less and less favourable soil, and we may then hope that it will pass over us more mildly than before, as experience seems to teach that it will. Let us not, at any rate, insist upon the contagionistic standpoint, which looks upon the unfortunate cholera patient as the infected centre! We shall tend him as before, so that the poor may easily obtain medical help and attention, but we will not shun him. Neither will we tear the well-to-do patient from the bosom of his family; his friends may attend upon him with all love and without any fear, seeing that there is not the slightest danger for them. We may certainly run a risk of being infected in the same place in which the patient became infected, but not from the patient as such. This was shown in the last epidemic, during which all the soldiers who were seized with cholera in the seven barracks of Munich were brought to the one hospital in Oberwiesenfeld, and this hospital in spite of the concentration of cholera cases did not become a centre of infection to others, whilst in previous epidemics the Military Hospital in Müller Street behaved very differently. Port writes on this subject in his report to the Cholera Commissioner for the German Empire, 'On the Cholera Epidemic of 1873–74 in the Garrison of Munich, and on the Influence of the Military Hospital during the Epidemic,' in the following manner:—'That cholera patients are not dangerous to their attendants has been proved in this epidemic in the Military Hospital, where not a single attendant has even suffered from the slightest choleraic diarrhœa. We cannot ascribe this, however, to the disinfection of every drop of the patient's evacuations. The evacuations are so bulky and so rapidly discharged that to deal with them effectually is impossible: they pour over the bed, the bedding, the clothes of the attendants, and, even if they could be generally quickly removed from the two former, they remain more or less long on the attendants' clothes, seeing that a more frequent change of clothes is either impossible or inconvenient. The following example may be cited in illustration. A cholera patient had so flooded his bed that he might have been said to be swimming in his rice-water stools. In order to give him dry bedding an attendant lifted him up in his arms, whilst another rapidly drew out the wet bedding and put dry in its place. In the short interval the patient evacuated in the arms of the attendant several litres of liquid, which ran down over the arms, trousers, stockings, and slippers of the attendant. Some hours later the attendant was again seen in the same clothing—the dejections had dried on his body and must have been scattered about in dust by his moving about, and must have been breathed both by the attendant himself, and by others, but no case of cholera resulted. Such incidents, more or less modified, are of frequent occurrence in a cholera hospital.' These facts may be cited, in order to counteract the terrifying contagionist notions, which are only too apt to make the attendance more than ever difficult. Let us, therefore, not shun those who are ill with cholera, but let us strive to render our soil in Munich less favourable for disease-poison, and less receptive of cholera-germs; but it must not be done when

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cholera has broken out amongst us—it must be done beforehand and at once.

Finally, everyone can do much for himself and his family when an outbreak does take place. To be the victim of an attack of cholera it does not suffice that the cholera infection should be prepared, and that there should be the required tropical and seasonal tendency, but there must also be the individual susceptibility. In one house there may be twenty or more persons exposed to the same infecting influence, but as a rule only one or two will take cholera. Experience has shown that the greatest influence is exercised by age, robustness, food, bodily and mental strain, clothing, cleanliness, &c. I cannot go further into individual dispositions at present, and must refer to a pamphlet on the subject which I published some ten years ago, 'What we may do against the Cholera.' One most important point is to avoid everything that tends to produce looseness of the bowels, the causes of which may vary with the individual. Nothing is so effectual in checking a cholera epidemic as careful attention to the state of the bowels, and medical assistance should be obtained as soon as the slightest premonitory diarrhœa shows itself. It is a great mistake to say that medical assistance is useless, and that because 50 per cent. of cases on an average die, it is immaterial what we do. This is only true for cases which take on immediately the extreme algid form, in which case little can be done; but against the beginnings of the disease, against diarrhœa and cholerine, medical treatment is not powerless, but, on the contrary, most promising. Medical treatment of premonitory diarrhœa is one of the most important prophylactic measures against the development of the severe and dangerous form of the disease.

Our sanitary authority will doubtless provide for quick medical relief, for the most careful watch over the supplies of food, and for everything which previous experience has shown to be important and useful. We may also hope that the enlightenment of the people of Munich will lead them to support loyally the efforts of the authorities to meet successfully any invasion of the disease, which, however, we trust may still be far distant from us.

[Although written in reference to the condition and requirements of the city of Munich, the facts and recommendations contained in Professor Pettenkofer's paper are applicable and valuable to all urban communities.—ED.]

MR. MARSH, of the City of London Tricycle Club, has been tricycling in the Alps. The following are the results achieved in this novel and interesting experiment:—Mr. Marsh left Lucerne on a tricycle upon Monday, July 9, early in the morning, and ran round part of the lake, and, *viâ* Weggen, Greppen, and Kussnach, to Immensee, on Züger See, the margin of which he followed to Art; then, ascending to Goldau, he ran down by Lowerz, along the Lowerzer See to Seewen; thence to Brunnen, on the Uri arm of Lucerne Lake, and by the margin of that lake to Flüelen. The second day was stormy, so he only ran through Altdorf to Amstäg. On the third day he ran up to Andermatt. The day following he ascended the Furka Pass, which is 8,000 feet above the level of the sea; and, descending by the Rhone Glacier, rode to Blitz-nigen, a post-house in the Rhone Valley. Next morning he rode to Brieg, ascended the Simplon, and slept at the Hospice, 6,500 feet above the sea level. On the sixth day he ran down the Simplon Pass to Domo d'Ossola; and on the seventh day by the margin of Lago Maggiore to Locarno.

THE RELATIONS BETWEEN GEOLOGY AND SANITATION.

By W. EASSIE, C.E.*

THE few remarks, which I shall have the honour of making, will bear upon the relationship between geology and sanitation, or what would broadly be called health; they will in no way treat upon the relationship between geology and sanitary engineering, or any of the remedial measures taken from time to time by man, to counteract any unhealthy geological surface presentations. To follow out my subject faithfully, I must also eschew all matters connected with botany, *per se*, although I may be obliged to refer occasionally to some actions of vegetation, which may affect the healthy conditions of some geological underground formations and superficial deposits. Neither do I consider it within the province of my subject to deal with meteorology or with climatology, because the relationship of these subjects to health is vast, requiring independent treatment, which I trust they will receive at the hands of the distinguished members of the Meteorological Society, who are now members of our Institute. I take it for granted that the earth was made for man, and not man for the earth, and inasmuch as the earth is simply a speck, or almost so, in our solar system, the relationship between health and the meteorological laws bearing upon our earth's crust, really calls for a separate grand division of our subject.

I only seek in this short address to present a few instances where geology becomes the handmaiden of healthiness or otherwise, to the beings born upon its surface; and the time at my command will not allow me to treat of any of the modes in which our terrestrial habitation is fouled by its present or past possessors. I shall say as little as possible upon mineralogy, although it is very intimately bound up with the lithological character and constitution of many of our rocks.

Without going into the question of food production in any detail, there can be no doubt that a man's health depends upon the kind, quality, and quantity of the food which he consumes, and inasmuch as all foods are derived from the earth—whether animal or vegetable—and are obtainable according to the rate of production, it may be wise to consider for a moment the very wonderful powers which some strata possess over others. Let us consider agriculture only. The student will find that the productiveness of soils, as remarked by Mr. Chambers, has no relation to the chronological succession of the various formations. 'The mere geological composition of soils affords no very reliable criterion of economic value. The same rock that produces the almost barren soil of Argyllshire, weathers into the fertile soil of the Channel Isles, and to the old red sandstone is due at once the rich soil of Hereford and Monmouth, &c., and some of the most barren heaths and moors in Scotland.'

The bulk of the tertiary formations are, however, very fertile. With regard to the thin soils overlying the chalk, they are of little value, and do not retain moisture. When the chalk, however, is found naturally covered to some depth with sands and clays, considerable fertility results. The lias and oolitic formations furnish valuable clays of great richness,

* An abstract of the address delivered at the Royal Institution, July 12, at the anniversary meeting of the Sanitary Institute of Great Britain.

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but they require considerable labour and attention. Perhaps the highest percentage of valuable land is found associated with the old red sandstone and limestones and marl beds. The same may be said of the mountain limestone and new red sandstone. As for the igneous rocks, though exhibiting much fruitfulness where well disintegrated, their value as a food-producing superficies is not great.

Changing the subject, let us now regard the kinds of formation chosen by the earliest civilised people in, for instance, our own country. It has been truthfully observed by Mr. Topley, of the Geological Survey, that the out-croppings of divers geological formations 'are marked by the occurrence thereon of numerous villages, whilst certain neighbouring formations are almost without any.' Mr. Prestwich remarks that London was first peopled upon its gravel-bearing surfaces, because these readily yielded good water. Where the eastern part of Northumberland, says Mr. Topley, presents isolated areas of a certain sandstone, these rocky patches contain the ancient villages and most important hamlets. This was because the soil was dry, and pure springs occurred at the edge of the clay. Of course the sites of more modern villages have been chosen because of the underground mineral wealth, but this is only a further instance of the power exerted over man by geology. In the district alluded to, out of twenty-three villages thirteen were at first built upon rock, six upon sand, and only one upon clay. Elsewhere he shows that narrow bands of clay are rarely found to be the sites of villages, and houses are even scarce; also that while wide clay areas are sparsely populated, on the intermediate formations of sand and limestone villages abound. It will also be found that a 'relation exists between the boundaries to which these villages give their names and the great physical features caused by the outcropping of certain strata.' It appears absolutely certain that the land divisions of the south-east of England have a well marked and constant relation to these great physical features. The position of the parishes was not the result of accident, or according to an order from Church or king, but resulted from these same great physical features. It has also been remarked by another author that 'no less than nineteen of the largest and most important towns in England, from Exeter to Carlisle, are all situated along the line of one geological formation, the new red sandstone, which, in addition to its own mineral treasures of rock, salt, gypsum, soda, and metallic ores, usually covers the invaluable deposit of coal, at once yielding an incentive and supply to the vast and enterprising population of this favoured district.' Here is another case where geology directly affects the habitat and condition of man.

When geology was comparatively a young science, it was nevertheless common to compare the chalk with its clean soil, clear air and pure water, to the foggy atmosphere and impure water supply of the London clay. The dry nature of a sandy soil was also compared with the moisture and malaria of a marshy district. This was first observed by Mr. G. F. Richardson, and comprehended pretty much all that geology was supposed to have in common with public health. Since then, however, we have begun to particularise. For instance, we say that buildings erected upon the limestones, such as the mountain limestone, and on the oolite series, and on well-drained sands, are built upon dry ground. If built on the marlstone the subsoil would be termed more moist; if built on the lias or alluvial ground, the soil would be denominated a damp one.

It should be borne in mind that throughout this paper, I have, on nearly every occasion, when quoting an author, been obliged to condense his remarks into the smallest possible space, I trust without spoiling the sense. But there is one passage which I must perforce quote in full; it is so true, and so suggestive, and also bears considerably upon our subject, because there can be no health, as Juvenal suggests, unless there be a sound mind in a sound body. The sentence was written by Mr. G. F. Richardson, and is as follows:—'The moral and social feelings of the inhabitants of particular districts are alike influenced by geological situation; and the enterprise of the islander, the local patriotism and attachment to home of the mountaineer, and the native of primary districts are (often without consciousness of the parties themselves) inspired by the physical geography of their native region.'

Such an argument as the above, but with a more direct bearing upon our subject, might be reasoned out in respect of the various classes of workers, which are associated with divers geological formations. In the huge iron districts, where coal and iron abound, where men—day workers and all night workers—are herded together in the smallest possible space, so as to be near their furnaces and rolling mills, one would not expect to find the robust health and longevity enjoyed by the fishermen on the sea coast. Neither would one look for a community of husbandmen upon hills formed of hard slaty rocks, with scarcely any soil upon them, on account of their great resistance to decomposition. Thus upon the granitic formations, which have never been abraded, or covered during the glacial era with many kinds of soils—as in the case of the Highlands of Scotland—one would expect to discover little else than wild game. It is very different in the case of the great central valley of Scotland, termed by Prof. Ramsay one of the most fertile areas in Great Britain; there are farmers by the thousand, and the highest condition of agriculture.

It is curious, also, to note that upon the old and new sandstones and marls, in Devonshire, Herefordshire, and Gloucestershire, &c., where many crops are grown, the above districts are termed the great tree districts of Great Britain, and are famous for apples and pears. Those healthy beverages, cider and perry, so largely consumed by the agricultural population, have, therefore, a direct association with the character of the rocks, seeing that they will not flourish upon other soils. It is another very curious fact, that the plain of the Carse of Gowrie, also famous for its apples, is situated over a tract of the old red sandstone.

It is singular, taking England as an example, that the distribution of certain diseases largely depends upon the absence or otherwise of valleys and rivers, along which the winds can sweep without interruption; in other words, upon the physical conformation of our island as it was left at the end of the last geological epoch, when it became fit for the residence of man. I will mention one or two instances, and the lessons which they teach would amount to this, that before making choice of a locality for people subject to certain ailments, it is wise to take its geological structure into consideration. Mr. Alfred Haviland says, after years of study on this matter, that 'those coastal counties most exposed to the prevailing winds are most free from obstruc-

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tions to their full operations, have the least mortality'—due to heart disease; 'whereas, those coastal counties, such as those along the south coast, which have barrier-like rocks and other characters which tend to interfere with the full sweep of the sea winds, are those which have a high mortality.' Where the precipitous and wall-like rocks are intersected by every variety of sea inlet opening into wide valleys, through which the winds can scour along, there is a lower mortality. He also remarks that, 'coincident with the lowest exposure to the sea, as in the Midland Counties, is the highest mortality of heart disease in those counties, and the lowest amount of mortality is coincident with the greatest amount of exposure. The counties which lie intermediately between these extremes have also an intermediate amount of death-rate.' His conclusions have been worked out with the extremest care, accompanied by maps. As an example, it may be instanced, that the East Yorkshire group of counties, which is bounded by a precipitous coast of oolite and chalk cliffs, say from Whitby to Bridlington Bay, and has no inlets, with an inland-directed water-shed, has a high mortality.

The low coast of sea-board, between Bridlington on the Isle of Sheppey, differently situated in respect of offering no check to the winds, has a very low mortality. These conclusions are well worthy of attention and of serious moment, seeing that the mortality from heart disease and dropsy amounts to more than one-seventeenth part of the whole mortality from all causes. London, as a division, has a low mortality, and coincident with this it is traversed by the great sea inlet, the Thames, with a twice a-day average rise of the tide between 16 and 20 feet.

About fifteen years ago Dr. Buchanan examined three of the southern counties of England with regard to the distribution of phthisis or consumption, and, without going into the details of his report, I will give his conclusions, which are as follows:—

'Within the counties of Surrey, Kent, and Sussex there is, broadly speaking, less phthisis among populations living on porous soils than among populations living on impervious soils.'

'Within the same counties there is less phthisis among populations living on high-lying pervious soils than among populations living on low-lying pervious soils.'

'Within the same counties there is less phthisis among populations living on sloping impervious soils than among populations living on flat impervious soils.'

'The whole of the foregoing conclusions combined into one—which may now be affirmed generally, and not only of particular districts—that wetness of soil is a cause of phthisis to the population living upon it.'

Mr. Haviland, a few years ago, writing upon phthisis in females, says that 'the warm, fertile, ferruginous, red sandstone tracts of country are remarkable for forming the sites of the most extensive series of low mortality groups throughout England.' The high elevated ridges of non-ferruginous and unfertile carboniferous limestone and coal, and the elevated, hard, unfertile, non-ferruginous Silurian form the sites of the most extensive series of high mortality groups.'

It is pleasing to know that the truthfulness of the above has been proved by the great lowering of the death-rate where districts have been sewered and drained. Dr. Buchanan is a cloud of witnesses in himself upon this point. Dr. Wilson has also stated that in the Kelsoe district fever and ague, which formed nearly one-half of the diseases of the population, almost wholly disappeared in ten years, consequent upon the general extension of an efficient drainage through the neighbouring country.

Passing to the subject of cholera visitations and its relationship to certain subsoils, some curious facts present themselves. I would prefer for the present to consider malaria and cholera in the one group, seeing that there are certain geological associations. In manifesting partiality for the alluvium of the river Ganges, say Drs. Lewis and Cunningham in 1878, cholera is not singular. Malaria and kindred diseases flourish about the deltas of large rivers everywhere. Malaria, they continue, resembles cholera markedly in this, that in many localities, such as the swamps of South Australia, both are equally unknown. The distribution of malaria is not less inexplicable than that of cholera, as, for example, its occurrence in the oases of the Desert of Sahara, in North Africa. They further add that the history of cholera throughout India presents one common feature, and that it can only be fairly regarded as endemic in such localities as manifest a close resemblance to the more superficial layers of their geological formation.

In 1832, when cholera first appeared in Paris, M. Bouhy, after long researches, satisfied himself that there was an essential connection between the geological condition of the earth and the tendency manifested by cholera to devastate certain parts, while it left others untouched. He says, further, that in countries where endemic diseases exist, as in those where epidemics were frequent, he found that the disease in almost every country was limited by the area of the geological formation, and that each geological basin constituted a natural seat for morbid affections—in short, that the 'medical constitution' of every country depended on its geological constitution in all cases where this geological constitution showed a distinctly traced character. The cholera in Paris was most virulent and most marked in those parts where there were tertiary or alluvial strata, and that it made but little progress, if any, in those countries where there existed non-absorbing rocks. He gives several curious facts in support of this theory. For instance, in Lyons there were fatal cases only in one faubourg, and that occurred on diluvial soil. But owing to the rest of the town being partly built of granite, and standing upon it, these portions escaped. The same association between soils encouraging evaporation and exhalation was noticeable during an outbreak of cholera at a place in Britanny, and it was discovered that there exists there a little basin of tertiary strata not found elsewhere, and, moreover, the whole soil of the place attacked is covered with diluvial deposit.

I think it may be taken for granted that the districts ravaged by cholera will be found geologically wanting in some healthy factor or another, permitting the subsoil to be loaded with organic matter. Going to the head-quarters of cholera, for instance, Calcutta, we shall see that the soil is of a very peculiar character, unfitted to yield good drinking water. Mr. Blanford describes it as a mixture of firm sand and clay, with decayed animal and vegetable matter, also loam, very much like the silt that settles from the water of a muddy river. Following this at a distance averaging eight feet is a bed of stiff clay

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and below this again is a layer of peat resting on alternating layers of sand and clay. The Hindoos, however ancient and learned a people, never understood geology, or they would never have laid down the lines of a city on such a soil without at least draining it. Even in our own country, where we are bound to reside upon the clay, as in the case of overgrown London, it is unsafe to build upon our pure clays without covering the site of the house with a few inches of concrete.

Just one word upon clay, as there are clays and clays. The London, the Wealden, the Lias, Carboniferous, and Silurian clays all vary in composition and in density. There is one capital method of discovering whether a soil is a clay loam, a strong clay, or a pure clay. If 100 grains of the soil be treated, and leaves from 40 to 70 grains of clay, it is a loamy soil; if from 70 to 15, it is a clay loam; if from 85 to 95 it is a strong clay soil; and when no sand can be separated it is a pure clay.

It would be impossible in the time allotted to me to do more than merely hint at some of the relationships between geology and the causes of disorder. I will name a few promiscuously. Take, for instance, the effect of damp soils upon health. These soils are cold and cause a mistiness in the air, inducing, when worst, catarrhs, rheumatism, and neuralgia. Moreover, the emanations which reach the surface are of an unhealthy organic character.

When active geological changes ceased, when the earth became fit to receive life, and it is in the same condition at the present time as regards the height of its hills, the depth of its valleys, and the width of its river beds, Nature had always provided, with rare exceptions, for the removal of water to the nearest stream, and if this natural flow is impeded, in the case of wet soils, paroxysmal fever follows. An instance of this occurred at the making of the Ganges and Jumna canals, and many other similar cases could be related. Drs. Parkes and De Chaumont have mentioned some of the soils which have been known to evolve the agent which produces periodical fevers in malarious districts. These are marshes, alluvial soils, soils of tropical valleys, sandy plains, certain granites, and metamorphic rocks and iron soils. With reference to the last mentioned, Sir Ranald Martin has directed attention to the fact that many reputed malarious soils contain a large proportion of iron. The direct association of the two deserves further examination.

The soil of the Roman Campagna, which so abounds with malaria, fever, and so on, is very shallow, and rests upon about seven feet of that peculiar substance called tufa, and this again upon other volcanic materials. There is therefore no subsoil, and no chance of circulation for air or water. When the heavy rains fall the water rests on the bed of tufa, which is impervious, and generates the unhealthy mists prevalent there. When the drought comes the soil is perfectly baked. Even if the soil itself were uncontaminated acqua-malarial fevers would ensue. It is very curious to note that although geology has produced such an insalubrious area, she has provided the cure for it. This the monks of La Trappe have discovered, viz., by boring holes into the deposits of tufa and placing dynamite in them, exploding this substance by electric conductors. In a very few days after these explosions a good subsoil has been established at small cost.

It would be impossible to give a list of the malaria and ague producing sites and their peculiarities in such a short paper, but I will mention one, because I suffered from it myself. I foolishly slept outside the closed tent, somewhat nearer the Jordan than my friend, a London physician, and the servants, and the result was that I caught a peculiar kind of ailment which took me three months' residence in Alexandria to throw off sufficiently to enable me to travel. Portions of the plains of Troy, I know personally also, are active in producing ague, and it is comical to see what a quantity of quinine the herdsmen will consume when they get the chance, which is very rare.

It is well known that health is greatly affected by the kind of water prevailing in districts, and here again there is an association between health and geology. Of the two waters hard and soft, the soft one is purer. Water of considerable hardness may be drunk with impunity; but when the carbonate of lime, &c., from the mountain limestones, and chalks, &c., are very abundant—although they are the least injurious of the ingredients which make water hard—they exercise a certain prejudicial effect upon man and beast. Drs. Parkes and De Chaumont observe that dyspepsia in the form of constipation or diarrhœa follow the use of certain hard waters. Dr. Sutherland discovered that the hard water of the new red sandstone rocks, formerly much used in Liverpool, also deranged the system; and, according to Dr. Leech, the substitution of soft water for hard water in Glasgow lessened derangements there. It is said that horses even regularly in use of hard water suffer from an abnormal growth of bone and a spoiling of the skin. Calculi are also generally believed to be formed by drinking hard water, and cured by a substitution of soft water. There can be no doubt that the geological features of a country exercise considerable influence over the inhabitants who drink the water flowing from them. Mr. Grange has shown that goître is a malady peculiar to districts where magnesian rocks exist, and where consequently the water holds magnesia in solution. Drs. Parkes and De Chaumont have shown that certain drinking-waters produce goître, and that when pure water is used the malady disappears.

The characters of water so variously affecting health depend entirely upon the geological association of rocks, and it would not be a waste of time to take a hurried glance over the field of hard and soft water-sheds in Great Britain. Professor Ramsey points out that the waters of the Scotch rivers are soft, and especially the waters in the Highlands are soft, owing to the fact of the mountains being composed of granite, mica, &c., and the other rocks being also, with some exceptions, almost free from carbonate of lime.

The waters from the Welsh mountains are chiefly from the Silurian rocks, containing little lime, and are consequently, for the greater part, soft. The purest supply in our country is that derived from the primary rocks, which edge in Loch Katrine, and which water now supplies Glasgow city. The waters of Bala Lake are also so pure, soft, and sweet, that it has been proposed to bring them to London. Waters which drain large areas of carboniferous limestone are always hard, and the same is true of the chalk formation, as well as of the lias and oolites, which largely contain limestone. On the old red sandstone areas, containing limestones or cornstones, the water is likewise hard.

Waters drawn from alluvial ground are great in quantity, but the quality is very rarely commendable.

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My friend Mr. Bristowe, F.R.S., mentions a case near Bath, where large trees were found beneath an alluvial red loam. The presence of these soft, old-world trees is not in favour of a well, and good water is never found in their vicinity. Great care should also be exercised when building over rocks with large fissures running through them.

The mineral waters, thermal or otherwise, with their strong medicinal powers, must not pass without notice, but I will be very brief. How they obtained their chemical constituents is a formidable enough question to answer, but a still more difficult one is as to how the hot mineral waters used for baths were produced, whether by chemical agency underground, volcanic proximity, internal heat of the earth, or by electrical changes. Natural hot waters have at all times been preferred to artificial waters for baths, and besides waters bubbling up from the earth, there are also the mud baths of Germany, mud rich in active agents, and used for baths and fomentations.

The mineral waters used for drinking purposes are equally valuable in disease and health, and the use of the sulphuretted saline and chalybeate waters are known to every one. In Great Britain we lack only one class of mineral waters altogether, and that is the carbonated class, which are so highly charged with carbonic acid. It is to be questioned whether the geological conditions of the neighbourhood of the Spas have not much to do with the benefit derived by their visitors, for there are more marked results when the waters or salts are used there than when made use of at a distance.

OPEN STREET DOORS AND THE SUPERVISION OF TENEMENT HOUSES.*

By EDITH P. BULLAR.

[The subject to which Miss Bullar draws attention in the following paper is one of much practical importance; and as there appears to be a prospect of some legislative proposals being made for meeting the evil, we give below, as a basis for such legislation, a somewhat extended account of the views expressed by the various philanthropists and sanitarians who attended the meeting at which Miss Bullar's paper was read.—ED. S.R.]

SOME of the evils arising from street doors of the poorer class of houses being left open at night having been brought to notice, further inquiry makes it evident that a wider view of the subject than was at first supposed necessary must be taken before an effectual remedy can be provided.

The custom of open doors prevails chiefly in the lowest streets and courts, where, as a rule, the houses are of the worst sort; neglected, out of repair, and deficient in all sanitary arrangements; so bad, indeed, in some parts as to have been condemned as unfit for habitation by the sanitary authorities two or three times over, but still from various causes remaining inhabited for years in the same neglected condition, no repairs worth mentioning having been done after the condemnation of the houses.

It would be impossible to speak too strongly of the harm which results from the poor being compelled to live in houses of this description, whether looked at from a moral or a sanitary point of view.

To take the lesser evil first. A house of six or eight rooms, with provision for water-supply, &c., on the smallest possible scale, will be let out to as many families as there are rooms. The drainage is constantly out of order, dust-bin seldom emptied, water-supply stopping from time to time; the water often stored in an open cistern, in which, on the rare occasions when it is cleared—more probably on account of hopeless leaking having made it necessary to mend a crack at the bottom than from any regard to the purity of the water—dead rats, rotten cabbage-stumps, and other abominations are found.

Substantial repairs are neglected; the roof allowed to become so bad that the family in the top room are compelled to move the bed to avoid the water which pours in when it rains, bringing down with it pieces of plaster from the ceiling; the kitchens, or rather cellars, several inches under the regulation height, with damp rising up the walls to add to the unhealthiness caused by constant bad smells from the drain-leakage, which has soaked the whole foundations, have the tops of the windows on a level with the street, so that the air which comes in when they are opened is often nearly as bad as that inside the room. It is hardly surprising that people constantly breathing this foul air take to drinking as a means of overcoming the feelings of weariness and oppression caused by it. Whitewashing is treated as an unnecessary luxury, years sometimes being allowed to pass without its being done; the walls, ceilings, and woodwork become black with dirt, and swarm with vermin to an indescribable degree; the damp and rotten boards of the floor get so begrimed that the wetting, if they are scrubbed, only seems to soak the dirt more deeply in than before.

A house of this kind, though it may not be overcrowded according to the legal definition of the term, certainly contains already more than enough inhabitants; but in many cases where the doors are left open the numbers are increased at night by the arrival of outsiders, who take up their position on the stairs and landings—persons of the lowest class, and utterly reckless as to any damage done to the house.

After a time fever or small-pox breaks out. The authorities may do all in their power to check it by the speedy removal of patients and careful attention to disinfection; still the epidemic continues and breaks out unexpectedly in fresh places where it is less easily accounted for. Doubtless much of this might be easily traced to tramps, who—taking advantage of the open doors—sleep in houses where there is illness, and then spread infection wherever they go. No amount of vigilance short of keeping the doors locked will ever prevent this.

Deaths, too, from non-infectious complaints, occur under very painful circumstances, owing to open doors; destitute persons in the last stage of illness will come in and hide in empty rooms or cellars, where sometimes they are not discovered till dying, or even dead. There is now, practically, no way of preventing this. Such cases have been proved over and over again, but still nothing is done to stop their recurrence.

Some time ago three lads were sent to prison for stealing lead from a roof; it was shown at the trial that they had been in the habit of sleeping on the stairs of a house with an open door, and by this means got easy access to the roof without attracting

* A paper read before a public meeting held under the auspices of the Charity Organisation Society, at the Society of Arts, April 13, 1883.

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observation. Thieves and others, who wish to elude the police, find open doors a ready way of escape, of which it has been proved that they take full advantage.

The facts already stated might be thought enough to call for some interference of the law; but moral evil far more serious is caused by the open doors. The stairs and landings of these miserable houses being safe from any inspection at night, are made use of for immoral purposes. This is a source of the most terrible corruption and vice, injuring not only persons who have already taken to lives of sin, but also those of respectable character, especially young people and children. The intruders who pass the night on the stairs are chiefly of the very lowest and most degraded class; they often come straight from the public-house, quarrelling, fighting, and making use of language so foul that those forced to hear it cannot speak of it without a shudder.

In these slightly-built houses everything said in the passages can be heard in the rooms, the consequence too often being the utter destruction of any feelings of modesty and purity amongst the inmates, and unavoidably causing a familiarity with sin which is a first step towards falling into it. Then comes the worst: parents turn out their daughters to sleep on the stairs, knowing all that goes on, and that the poor girls are quite unprotected. The police could tell how, when they urge the girls nightly collected in the Haymarket and elsewhere to give up a bad life, the answer often is that they hate it, and would willingly do so, but that they have fallen too low and now have no choice left them. Does not this sufficiently prove the need for action? These bad parents themselves had probably much the same bringing up as their children, and the extreme facility afforded by the open doors tempts them to this unnatural wickedness; while parents of a better type are powerless to keep their children free from the knowledge of evil.

It has been said that the tenants should combine and insist upon such abuses being remedied; but this would seldom be possible. If they had decent landlords they might do so; but a respectable landlord does not wait for his tenants to insist before he does his duty, and therefore gives them no cause for complaint.

The houses where the evils now brought forward are permitted are in the hands of the very worst—not poorest—class of landlords, who care nothing for the welfare of the tenants, but merely wish to make money out of them, and from the scarcity of lodgings have them practically completely at their mercy. The regular answer to any complaint or most reasonable request for whitewashing or repairs is that if they do not like the rooms they can leave; the expense and trouble of moving, with small prospect of finding a better room at the same rent, would be bad enough if the tenant were in an independent position; but very often this is not the case, the habit of the landlords being to allow the rent to run on till the tenant is hopelessly in debt, and then to wring out payments more or less irregular by continual threats of putting in the broker.

The benefit to property of keeping the doors locked is undeniable; the difference between houses in the same street where this is or is not done being most striking; but sometimes these low class landlords deliberately allow the houses to fall into the worst condition, hoping to be the gainers first by saving the sums which ought to have been spent on repairs, and then by receiving compensation when at length, past any pretence of being still habitable, the houses are pulled down by order of the authorities.

How it comes about that houses can be allowed to remain inhabited after being condemned two or three times over may be a mystery to the uninitiated. A trustworthy person who lodged for some time in the same house with a parish beadle states that the hampers of stout, cheeses, hams, and other presents constantly arriving for him were quite enough to account for the non-delivery of notices to their generous donors; but there is something very reprehensible in a system under which the authorities are content with giving an order, and take no notice as to whether or not it is carried out.

It might be supposed that tenants in houses belonging to companies professedly acting for the benefit of the poor would be safe from the various hardships borne by those who hold under bad landlords; this, however, is not invariably the case. Houses under such management have been known where repairs were neglected, drainage in a horrible state, whitewashing a thing of the remote past, the tenants bullied by the rent-collector for complaining to an outsider when complaints to himself were found to be of no avail; and where, though money had been spent on the houses, the work had been so badly done that it was simply wasted, which yet did not prevent the fact of money having been laid out being used as an argument against doing anything more to houses then in a most unhealthy condition.

When complaint was made there had already been sickness and deaths amongst children; later on, scarlet fever, typhus, and small-pox raged. The sanitary authorities had full notice of the state of these and other houses, and actually inspected them some months beforehand; but till the epidemic broke out, nothing to speak of was done.

All this is allowed to go on while vestries have full power to act; if they would put in force the By-laws *re* Tenements under the Public Health Act, 1866 (29 and 30 Vict. c. 90, sect. 35), these abuses would be stopped at once. It may, therefore, be fairly argued that the reasons which were formerly considered of sufficient weight to necessitate the passing of the bye-laws, now hold equally good in a demand that the power of enforcing these bye-laws should be transferred to some other authority which will not allow them to become a dead letter.

If tenement houses were in this way assimilated to common lodging-houses, no hardship would be inflicted on good landlords, while tenants would enjoy the protection against bad landlords which the Legislature has already endeavoured to afford them.

There is another way in which the condition of the poor in London might be vastly improved, namely, if the ground landlords and house owners would interest themselves on their behalf, insisting that properties should be properly looked after and inspected from time to time by their own agents, who ought to pay their visits without notice, so as not to be expected and prepared for beforehand.

In the worst parts, inhabited by the very lowest classes, probably nothing short of constant police supervision would maintain anything like a decent condition of life; the lawless habits of the people would make milder measures useless. But there are many places now in a very bad state as to morals where, if the inhabitants had the help of a really good landlord, a most substantial improvement would

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be made. No doubt there are some thoroughly bad people whose reformation could not be brought about by any mere change of outward circumstances; but this is not the case with all. There are many who lead bad lives more from weakness than from wickedness, and who, if they had a fair chance given them, would improve into respectable members of society, instead of sinking down and down as they do now, dragging others with them.

A small street, inhabited almost entirely by one-room tenants, now bearing the character of being the most immoral place in Lisson Grove, is a strong example of the power of landlords for good or evil. Till about eight years ago this street was quiet and respectable; it then came into the hands of a new landlord, who employs an old man living in one of the houses to collect the rents, and comes round himself once or twice a week to receive the money. This landlord is entirely indifferent about the morals of his tenants; no inquiry is made as to the character of new comers, disgraceful over-crowding is permitted, street doors are left open at night, and the stairs made use of as already described. Every wickedness is allowed to go on, just stopping short of what the law would interfere with. Two or three years ago an attempt at murder having been brought to light, things were found to be so bad that the whole house where it occurred was cleared by a magistrate's order. In these houses are a few really steady respectable people; they have repeatedly asked the landlord to put locks on the doors; he does not deny that this is his duty, but still he does not put on the locks.

No. 1 in the same street belongs to another landlord; the house is kept in good repair, the street door always shut, each tenant having a latch-key, and the house is thoroughly quiet and respectable, in spite of the disadvantage of situation. The landlord will not allow any tenant to remain who does not behave in a proper manner.

If ground landlords, in granting a new lease, would insert a clause providing that, however often the house were sub-let, it must only be on the terms that the street door was kept locked at night, much good would be done.

The sub-landlord of a house bearing a specially bad character in a poorer street than the last-mentioned is a Dissenting minister. Some year ago he had the two kitchens thrown into one, making a large room, in which he used to hold a service. The following notice, signed at the foot with his name, was clearly written and placed on the inside of the street door: 'No person allowed to stand idly at this front door, neither must this door be left open, only for proper uses and during the hours of service below. Persons failing to observe this will be desired to leave, as this house must be kept respectable.' For some reason, said by those in the house to be that the room became too damp to be suitable for the purpose, the services were given up. The room was then let to be inhabited; at the same time the landlord apparently gave up his wish for respectability; the notice was allowed to remain above a gaping hole, which showed where, in better times, the lock had been, the whole house became disreputable, drinking and fighting went on in the kitchen, and here there was actual murder—that is to say, a man was so nearly killed in a fight that he only survived it a few hours, though at the trial afterwards a verdict of manslaughter was given. Two girls from this kitchen complained bitterly of being turned out to sleep on the stairs.

In many cases it is true that houses are already let on long leases, and the owner or ground landlord can exert little legal power; still his moral influence would have great effect, and he might do infinite service by letting it be understood that he took an interest in the condition of the people living on his property, and would not stand by quietly and allow them to be unfairly treated and forced into an involuntary association with degradation and crime. The ground landlords, too, could gradually put a stop to the pernicious system of repeated sub-letting, now so common, which is a source of much mischief and injury to the poor in many ways.

At first sight it may seem as though in what is now proposed the interests of the worst people, those consequently in most need of help, are ignored, but this is not so. The writer, feeling some doubts as to whether the refusal of bad tenants, though it would improve the character of certain streets, would on the whole be of any use—whether, in fact, it would not merely remove the same evils to another place—had a conversation on the subject with a police superintendent of many years' experience, and was assured by him, with the utmost confidence, that there was no need to fear this; that nothing could be more useful than to keep bad people constantly on the move, as during the first three months or so of their residence their influence with neighbours was so much less that they would do comparatively little harm. If, therefore, the same plan were adopted in all parts, it would be an inducement to tenants to try and keep a decent character, and as they are generally a little more careful in their behaviour just at first, a gradual improvement would be brought about in this way.

What is required then is, first, the transferring of the existing legal power to the right quarter, so that it may be steadily enforced; and, secondly, the help of ground landlords and house-owners who, when this was done, could soon bring about a reform by taking the side of the law instead of, as is now too often the case, showing by their inaction that they are indifferent about the matter, and so allowing the sub-landlords to grind down the tenants without any fear of consequences or any inducement to treat them better.

Discussion.

The discussion was opened by the Rev. J. Llewelyn Davies, who fully corroborated the statements made by Miss Bullar, and urged the necessity of a reform.

Lord Mount-Temple said that the mischief arising from open doors was an idea quite new to the majority of those present, but that the remedy seemed to him not to be very difficult, and certainly ought not to be so. It ought not to be difficult to arrange that tenement houses should always be provided with locks and keys. As long as doors remain open the stairs are practically a thoroughfare resorted to by persons making a bad use of it. On this ground the police ought to have the right of entry, as they have to every other public place. Indeed, looked at in this light, he thought the police already had it; but if not, it was most desirable that it should at once be given them. The suggestion had been made that by-laws might be utilised; and it appeared to him that by-laws enforcing cleanliness might be considered by the Local Government Board right ones to sanction. If the

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subject be properly ventilated, he thought that in a short time we should have no difficulty in finding a remedy. Probably no one would have any reason for opposing such a measure as he had described, and therefore it would very likely be easily carried. Anyhow, certainly the present condition of such a large number of the population was a stain on our civilisation. It would be valuable if we could first ascertain the exact state of the law; he therefore called on some of the gentlemen present who were familiar with the subject to make a statement.*

Mr. Shirley F. Murphy, Medical Officer of Health for St. Pancras, stated what was done under the Sanitary Act of 1866. When that was passed by-laws were prepared by medical officers of health, and efforts were for a time made to enforce them. They gradually, however, fell away, the reason of their failure being that they were really contrary to law, and the possibility of their enforcement was therefore doubtful. The Secretary of State had approved illegal by-laws which had not been subjected to legal criticism. By-laws made now would probably have a better fate, and his belief was that the enforcement of street by-laws for cleansing and for proper accommodation, and against overcrowding, would have an exceedingly beneficial effect. There should be regulations as to the number of persons sleeping in one room, and penalties attached to their infringement. The old by-laws are so cumbersome as to be practically useless in controlling overcrowding.

Dr. S. Gibbon, Medical Officer of Health for Holborn, stated with respect to the Sanitary Act of 1866 that he took the trouble to prepare by-laws, but the Vestry would not sanction them. In Whitechapel they were for a time put in force, but were quickly dropped because the state of the law was so defective as to make it impracticable to carry them out. For instance, the classification of the kind of houses on which they were brought to bear was so vague as to bring houses of a quite different class under these stringent rules, and the well-to-do inhabitants would not stand it. His opinion was that the remedy lay in making every house have a resident sub-landlord, who should be responsible for its condition. To keep locks and keys in some districts would be impossible. He knew houses next to so-called 'thieves' kitchens' where every lock worth *6d.* is taken off and sold as soon as it is put on, and his opinion was that even if locks were put on and their use enforced very little good would be done. He thought by-laws might be readily sanctioned, and also that the police might have authority to go into these houses through the night. The first step was to give publicity to the matter, that ground landlords might know and be able to act about it.

Dr. Thorne Thorne, assistant medical officer of the Local Government Board, disagreed with Dr. Gibbon's statement. He knew cases where locked doors and whitewashing had had a perfectly marvellous effect in educating the people. A case in point brought this so strongly before him that he resolved to come to their meeting to testify to it, and distinctly to enforce Miss Bullar's statement. He once had occasion to visit at night certain courts in a large town in Yorkshire. All the houses round opened into these courts, and a more revolting scene of brutality and abomination he never saw. Later he was asked by the medical officer of health to visit the place again, and found a wonderful change for the better. He asked the cause, and was told that since his last visit they had applied locks and keys to every privy, and that this had brought about a change in the whole state of things. He had brought with him a model code of by-laws for houses let in lodgings, other than common lodging-houses. By-laws for tenement houses, as asked for, were applied in many parts of the country, and could be applied by any local authority that asks for them. Every single point mentioned in the paper was mentioned in them; but they have never been applied in London. By these by-laws tenements are open at all times to the sanitary officer. He had paid visits to similar houses at all hours of the day and night; and certainly of all scenes of hideous immorality he could conceive none worse; he thought the want of privacy was the real cause of it all. If this paper were taken in connection with the evidence given before the House of Lords' committee, it would be seen to prove the case to be as he said. Such awful things take place in these tenement houses that all efforts should be made and enforced to put an end to it. Such scars of vice as are inflicted on children and young girls by these sights and these examples were physically and morally perfectly irremediable; and as long as youths and young girls were exposed in this way the same evils must go on. The proper persons to act are the sanitary officers and the vestries, who should apply this code to these houses. If firmly and patiently enforced he believed an improvement would take place at once.

Dr. Gibbon inquired if these by-laws were applicable to London, as if so that would solve the difficulty at once.

Dr. Thorne Thorne said the words were the same, the clauses the same, therefore he apprehended the by-laws would be the same.

Mr. Ernest Clarke said he had been to the Local Government Board to inquire if the section in the Public Health Act dealing with by-laws as to tenement houses had been taken advantage of by sanitary officers. He found there had been a rush at first of applications to be clothed with powers for regulating such houses by by-laws, but local authorities had to ask the permission of the Local Government Board before they could obtain such powers, and he thought this had militated strongly against their more frequent exercise. The section should in fact be of general application instead of permissive only. He quite agreed with Dr. Thorne that the model code of by-laws would be amply sufficient.

Mr. John Holland, M.P., stated that he had been

* Some doubts having been expressed as to the exact legal position of the metropolis with regard to the regulation of tenement houses, we think it well to explain that under sect. 35 of the Sanitary Act, 1866, as modified by sect. 47 of the Sanitary Laws Amendment Act, 1874, the Local Government Board may, on the application of any metropolitan local authority, declare by notice in the *London Gazette* the following enactment to be in force, and thereupon the authority is empowered to make regulations:—'(1) For fixing the number of persons who may occupy a house or part of a house which is let in lodgings or occupied by members of more than one family. (2) For the registration of houses thus let or occupied in lodgings. (3) For their inspection and the keeping the same in a cleanly and wholesome state. (4) For enforcing therein the provision of privy accommodation and other appliances and means of cleanliness in proportion to the number of lodgings and occupiers, and the cleansing and ventilation of the common passages and staircases. (5) For the cleansing and lime-whiting, at stated times, of such premises.' Section 47 of the Act of 1874 adds that—'Regulations made under the said [35th] Section [of the Sanitary Act, 1866] may extend to paving of rooms, paving and drainage of premises, the separation of the sexes, and to notices to be given of precautions to be taken in case of any dangerously infectious or contagious disease.'—[ED. S. R.]

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on the committee of artisans' dwellings, and asked if the code had ever been enforced. He was told it had been tried in one or two places but had been dropped after a year, he supposed as being too much trouble.

Mr. A. Wynter Blyth, the medical officer of health, Marylebone, said he could ratify and supplement Miss Bullar's statement. At present the power of sanitary officers is much limited; if enlarged to all night there must be a sanitary night inspector or police. He had found the greatest difficulty in getting witness to overcrowding. In one room where eight people had been sleeping all night he could only find two in the morning and they denied any knowledge of the fact. He thought there should be more stringent regulations as regards tenement houses, and that no house built for a single family should be allowed to be inhabited as a tenement house till certain necessary alterations had been approved and certified by the sanitary authorities.

Dr. James Edmunds, M.O.H., St. James's and Soho, said it was asked whether vestries did their duty; but he asked whether the public did their duty. It was desirable that gentlemen should serve on vestries who were not interested holders of tenement houses. Gentlemen now refuse to serve and the power goes into the lowest public-houses. The people who served on vestries were too often interested. He spoke from experience, having summoned and punished a principal vestry man on the very Board of which he was the medical officer of health. Besides gentlemen serving on vestries three things are really wanted:

(1) Greater legal facilities for the reconstruction of artisans' dwellings.

(2) The requiring a tenement holder to have a representative lodger upon the premises in the front ground floor room, and a gradual development of the *concierge* system.

(3) Making all passages and staircases left open at night open to the police like all other public ways.

Building societies are wanted to build—not as charity but on sound business principles—proper dwellings for the poor like those on the Queen's Park Estate, built under the Artisans' Company Act, and paying a solid 5 per cent. as business investments.

Mr. F. D. Mocatta said the question was one of burning interest and must be settled by some means. He ventured to say if it were made penal for any landlord to have a house without lock or key they would find means to keep them on. The fact is that the mass of persons who exist on tenement-houses only think of getting all they can out of them: they make 10 or 15 per cent. out of their houses, and these people ought to be subject to inspectors.

The Chairman did not at all hold with giving more power to the police, particularly at the present juncture, when they will probably be made imperial instead of municipal servants, making it more than ever outside their province to deal with sanitary matters.

Mr. Samuel Morley, M.P., said he would not rest an hour without doing something, and that he would go thoroughly into anything done to help. We had a cancer in the midst of us which was eating out the heart of the people. He thought some very strong expression of opinion was required, and would suggest that a committee be appointed to consider the best method of dealing with the evil. He would certainly give power to the police; at any rate till the code of by-laws could be enforced or something better could be done.

Several other gentlemen spoke, and, after an able summing up by the chairman, a resolution was passed recommending the more general enforcement by the local sanitary authorities of the powers conferred upon them by the Acts of 1866 and 1874, with regard to making by-laws for the registration, occupation, and wholesomeness of tenement houses.

Amongst those interested but unable to attend were Lord Henry Scott, Mr. John Simon, Mr. Arthur Pease, M.P., Mr. Lovett, M.O.H. St. Giles's, &c.

Subsequently to this public meeting, Mr. Samuel Morley—whose philanthropy is nothing if not practical—convened a further meeting at his London house to discuss in what way practical steps could be best taken with a view of remedying the grave moral and social evils connected with the existing condition of many of the tenement houses in London, to which Miss Bullar has drawn attention.

Lord Shaftesbury thought that something might be done by passing—possibly during the present session of Parliament—a short Act conferring upon the police similar powers of inspection and control with reference to tenement houses to those now possessed by them for the regulation of common lodging-houses. He looked hopefully to the direct and powerful action resulting from police supervision; and he felt sure that to produce a permanently good effect they must aim at the creation and preservation for the poor of a domestic system which was the basis of all national greatness.

Mr. H. M. Bompas thought that we should hesitate before throwing the responsibilities of the educated and richer classes upon the legal authorities. Two things seemed to be requisite—the election of a better class of men to our boards, and a larger provision of superior accommodation for the poor. The solution of the difficulty would be arrived at to a large extent if the upper classes would feel the same interest in the poor of our large towns as they do in those in the country districts.

Dr. Edmunds mentioned that in the St. James's district some modification of the evils complained of had been brought about by the adoption of a plan similar to the *conciergerie* system; and Mr. Simon thought that the present law gave the police the power to interfere for the protection of public decency, as such houses as had been described would come under the description of 'disorderly houses.'

Lord Mount-Temple suggested that a memorial should be forwarded to the President of the Local Government Board, and after discussion the following resolutions were unanimously agreed to:—

1. That this meeting, in consideration of the frequent lack of sanitation and general supervision in tenement houses inhabited by the poorer classes, resolves to memorialise the President of the Local Government Board to declare the enactment of the 35th section of the Sanitary Act of 1866—referring to 'lodging-houses'—to be in force throughout the metropolis, according to the powers entrusted to him by the Act of 1874; and—2. That the attention of the Local Government Board be called to the condition of tenement houses, owing to the frequent absence of locks to the front door, and even occasionally of the door itself.

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PROPOSED EXTENSION OF THE POWERS OF LOCAL SANITARY AUTHORITIES.*

By J. M. ELLIOTT,

Chairman of the Newton Heath Local Board.

NOTIFICATION OF INFECTIOUS DISEASES.

THE subject of notification of infectious diseases has at various times during the last few years engaged the attention of sanitary authorities. Papers have been read and speeches delivered by most eminent professional and scientific men, and it must be admitted that this is a subject of very great sanitary importance. Having for many years taken a great interest in local sanitary work, I should wish to draw public attention, and more particularly the attention of local sanitary authorities, to this great question.

From my own observations in the township of Newton Heath, adjoining the city of Manchester, the thought often occurred to me that compulsory notification of infectious diseases would be a very desirable object to obtain. In fact, the subject was practically forced upon my attention by an outbreak of typhoid fever in my own township in November last.

The first intimation was conveyed to me, as Chairman of the Local Board, by letter from one of our medical practitioners residing within the district, to the effect that several of his patients were suffering from this disorder, and requesting the attention of the authority to an anticipated outbreak of an alarming magnitude.

Now this early intimation was given quite voluntarily and gratuitously, and reflected the highest credit on the medical gentleman in question. Our medical officer of health and other officers of the Board were immediately communicated with, and everything that could be done was done to stem the spread of the outbreak. The milk supply was inquired into and analysed by a public analyst, and pronounced pure, the farms from which the milk was principally supplied to the majority of the cases infected were inspected and reported upon. Isolation, where practicable, was effected; removal to hospital was carried out; disinfectants were largely used; circulars were issued to every dwelling, cautioning the inhabitants, and giving directions and advice how to act in case of attack. I do earnestly believe that the outbreak, although fatal in too many cases, yet would have proved far more fatal had it not been for the early intimation before referred to, thus enabling the Board to act with a promptitude that would have been impossible had not such early intimation been made.

The medical officer of health of the Board having no cases in his own practice, was necessarily unaware of the outbreak existing in another part of the township.

Several corporations, representing some of our largest cities and towns, have sought for and acquired powers for the compulsory notification of infectious diseases, and *all* the medical officers of health representing those cities and towns with whom I have corresponded testify to the good results arising therefrom. Amongst the towns that have acquired this power are Edinburgh, Manchester, Salford, Bolton, Bradford, Huddersfield, Nottingham, Newcastle-upon-Tyne, and Wakefield; and amongst those who have no such powers are Liverpool, Leeds, and Birmingham.

The one that has engaged most of my attention during my inquiries is a clause—which I fully endorse—adopted by the Corporation of Edinburgh in 1879, and reads as follows:—

'§ 28. In order to secure more prompt action in dealing with infectious diseases, every medical practitioner practising within the burgh shall, within twenty-four hours of the same coming to his knowledge, report to the medical officer of health every case of cholera, typhus fever, diphtheria, small-pox, scarlet fever (scarlatina), and measles (in this Act characterised as infectious or contagious diseases) occurring in his practice, and stating the house or place where the patient is being treated, under a penalty not exceeding 40*s.*; and if it be found on inquiry by the medical officer of health that the diagnosis of such practitioner was correct, such practitioner shall be paid the sum of 2*s.* 6*d.* for each case reported and verified as aforesaid; and in order to facilitate the making of such report, every such practitioner shall from time to time be furnished, on application to the medical officer of health, with printed forms stamped for postal transmission.'

In a paper read at the Nottingham Congress of the National Association for the Promotion of Social Science, Sept. 1882, by H. D. Littlejohn, M.D., medical officer of health, Edinburgh, we find that this clause has worked exceedingly well and proved satisfactory beyond expectation, that the Corporation and the community at large, from experience, had learned its worth and were so convinced of its value 'that rather than lose the advantages of the clause they would willingly raise the professional fee from 2*s.* 6*d.* to 5*s.*' This fact speaks well for the clause and its working in Edinburgh.

If there are so many advantages to be gained, why should not such a power be granted to all local sanitary authorities? At the present time we have only the 'death' returns to act upon, but by the compulsory notification clause we should be made aware at the very commencement of an infectious outbreak, and thereby placed in a position to take preventive measures to stamp out the disorder before it had time to spread into an epidemic form. The authority, in conjunction with and under the advice of the medical officer of health, could, by means of such early intimation, secure prompt isolation, removal to hospital, disinfection, &c. By early intimation our day and Sunday schools could be protected by preventing children belonging to infected localities attending these schools, and in extreme cases obtain an order to close schools.

I submit that every qualified medical practitioner in every township or district should be compelled by law to notify to the authority of such township or district, within a specified time, every case of infection or contagious disease occurring in his practice, subject, of course, to the authority paying such practitioner a fee of not less than 2*s.* 6*d.* for each case so reported and verified by the medical officer of health acting on behalf of such authority. The small fee suggested for furnishing such a report is a mere courteous acknowledgment for service rendered. In point of fact, the amount of fee, to my

* Paper read by J. M. Elliott, Chairman of the Newton Heath Local Board, before the Association of Local Boards and other sanitary authorities in England and Wales, held in the Civil Court, Town Hall, Leeds, on Thursday, March 22, 1883.

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mind, is nothing when compared to the importance of early intimation of the occurrence of diseases under consideration.

Removal of Infected Persons to Hospital. Section 124 of the Public Health Act.

This question is one of the greatest delicacy, and requires very careful handling. By sections 120 to 123 of the Public Health Act, 1875, local authorities have power to compel houses to be cleansed and disinfected, to destroy infected bedding, clothing, &c., to provide places, apparatus, and attendance for the disinfection of such bedding, &c., to provide special carriages or ambulances for the conveyance of persons suffering under an infectious disorder to hospital, and, by section 131, power is given to build hospitals or other places of reception for the sick. Yet, by section 124, any person suffering from any dangerous infectious disorder, not sufficiently isolated or properly lodged, can only be removed on a certificate of a legally qualified medical practitioner and by an order made by a 'justice of the peace.' My point is this, what is the good of giving such powers as are contained in sections 120 to 123 and section 131 when the power under section 124 is so restricted? I consider section 124 should be enlarged.

No doubt the Legislature had in view that some safeguard was required on behalf of the public; but is it a fact that a legally qualified medical practitioner's certificate is safeguarded by such a proceeding? I venture to think otherwise, because I take it that a justice of the peace would not like to take the great responsibility of refusing to make an order of removal under such circumstances. In my opinion, every local authority should have full power on the certificate of its medical officer of health to make an order of removal of any person suffering from any dangerous infectious disease, and who is considered by such medical officer not to be sufficiently isolated or properly lodged. In times of infectious outbreaks persons such as those referred to would be much better removed even for their own sake, as by such removal to hospital they would secure better attendance and nursing, besides limiting the risk of spreading the disease to other members of their families or friends if they remained in a house or room in which no due means of isolation could be carried out.

If it were not for hospital accommodation it would be almost impossible to successfully grapple with epidemic diseases. If isolation or proper lodging cannot in all cases be secured by any other means, why then should any morbid sentiment stand in the way of 'compulsory' removal to hospital?

Let us consider for a moment the case of an ordinary greengrocer in a small way of business and living in a four-roomed house—say shop in the front, living room at the back, and two bedrooms over, with a family of six persons (including himself and wife). Now, if any member of such a family was suffering from an infectious disorder and could not be isolated and have an independent nurse, would it not be desirable to order such sick person, on the earliest verified intimation, to be removed to hospital, otherwise the risk of spreading the disorder should be greatly intensified from the fact that some one member of the family would be both nursing the patient and possibly handling and serving to the public the various articles on sale.

Surely there can be no question as to the importance of removal in such a case. Yet there are many such occur which are not reported upon, thereby causing infection to spread to a greater extent than it otherwise would. The removal alone does not entirely end a case of that kind. Part of the premises being used as a shop and visited by the public, it should be incumbent on the authority to close such shop for a short time, to destroy all the saleable articles liable to infection, and to disinfect the whole of the premises and contents therein before allowing the same to be reopened for the sale of goods. In such cases compensation should be allowed to the occupier, at least to cover the cost of the goods or articles so destroyed.

I could go on citing cases to further illustrate the advantages to be secured by compulsory removal, but my object is not to make a lengthy address but an endeavour to convince the members of the association of local boards that an extension of the powers of local authorities is much needed, and demands the attention and favourable consideration of the Local Government Board.

Health Officer.

As to the selection of medical officer of health, I am of opinion that every public medical officer of health should devote the whole of his professional services to strictly sanitary duties, and should not be engaged in any private practice. This would be more satisfactory to himself, the other medical gentlemen practising in his district, and to the community generally. The medical officer of health would under such an appointment be relieved from conflicting interests and professional misunderstanding. Doubtless the only drawback to such a proposition would be the annual cost upon the ratepayers. This, however, could be met by grouping together or combining several adjoining districts, and each authority paying its proportion of the salary of such medical officer, according to the rateable value or according to the number of ratepayers. The very title of Board of Health denotes the work and responsibility that is expected, and surely it devolves upon every authority primarily to see that its sanitary arrangements are in the most perfect condition in every part of its machinery; and the most paramount, in my opinion, is to secure the entire services of a thoroughly qualified medical officer, to be responsible for the health department of the district or districts to which he is appointed. Secondly, that such medical officer of health should be supported by the compulsory notification clause before referred to; and lastly, that the medical officer should have the power and authority to make an order for the compulsory removal of any person suffering from any dangerous, infectious, or contagious disorder, who is considered by him not to be sufficiently isolated or properly lodged.

Recovery of Cost of Maintenance of Patient in Hospital.—Section 132.

I am of opinion that the whole of this section should be abolished, as the real object to be attained, in sending infectious cases to hospital, is to prevent the spreading of disease, and death, and, is most assuredly for the benefit of the general community; therefore, why should the head of a family, or other person, be charged with the cost of hospital maintenance when such compulsory removal is made in the interest of the public?

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Dr. Buchanan, in his report to the Local Government Board (Feb. 1882) advocates removal to hospital, as the only available means for preventing the extension of disease, that typhus fever and relapsing fever were not got rid of by improvement in drainage and water.

Dr. Thorne reports: By far the larger number of patients are found to have been derived from the wage-earning classes, such as labourers, artisans, mechanics, domestic servants, &c., that is to say, from the classes specially characterised as having no proper means in their own homes for the isolation of persons suffering from infectious disease, and through whose families the danger of the spread of infection is most general. We also find from Dr. Thorne's inquiry relating to the 'use and influence of hospitals for infectious diseases,' that this subject, the recovery of cost of maintenance, has been considered by many sanitary authorities, that it is the conviction of some that the fear of having to repay such cost has prevented persons who most needed isolation from availing themselves of the only isolation provision which could be obtained.

When we consider that the cost of building and maintaining hospitals, in the case of corporations and other bodies, is paid for by the ratepayers, and that the cost, in cases of sanitary authorities who contract with such bodies for the reception of patients into hospital, is also defrayed by the ratepayers; surely it is a little unreasonable and a hardship to make any charge to any resident within the district in connection with compulsory removal to hospital, especially if it is admitted to be for the general good of the inhabitants. Something might be said as to the great difficulty experienced in securing even a very small percentage of the repayment under this section, but I prefer to rely on the broader and more liberal line of argument, that the entire cost incurred in carrying out a compulsory removal to hospital—before referred to as being for the benefit of the public—ought to be borne by the public.

HEALTH OF RUGBY.—Either Rugby must be an exceptionally healthy place, or else the 'Shadow clothed in black that keeps the keys of all the creeds' must have forgotten the pleasant little town, for it is stated in the 'Parish Magazine' that not a single burial took place at the Rugby Cemetery during the month of July.

EPIDEMIC INFLUENZA.—In commenting on the unusual prevalence of such local and painful maladies as neuralgia and a peculiar influenza in St. Marylebone, Mr. Wynter Blyth observes, in a recent report, that in those cases which came under his own observation, the peculiarity consisted in their unusual character. The individuals affected were perfectly well, without the least trace of illness, one or two hours previous to the attack, and then the eyes ran, the mucous membranes of the nose and chest were affected, and the cold as it were attained its height at once by what may be called an explosion. Mr. Blyth adds that the same suddenness of onset marked the much more serious influenzas of the fifteenth century.

VENTILATION OF PUBLIC BUILDINGS.—Messrs. Robert Boyle & Son, 64 Holborn Viaduct, and Glasgow, have had their system of ventilation adapted for the following public buildings:—New Art Galleries, Liverpool; New Art Gallery, Birmingham; Guildhall, Bristol; New Public Hall, Cardiff; General Post Office, Manchester; New Theatre and Concert Hall, Devonshire Park, Eastbourne; Boys' Home, Forest Hill; Children's Hospital, Brighton; New Workhouses, Wandsworth. They are also at present ventilating for Mr. Arthur W. Blomfield, F.R.I.B.A., St. Michael's Church, Paddington; St. John's Church, St. Leonards; and Emmanuel College Chapel, Cambridge.

THE
SANITARY RECORD.
AUGUST 15, 1883.

Owing to unforeseen circumstances, Chapter IV. of the 'Hints to Sanitary Inspectors,' containing observations and suggestions on the subject of Drainage, is unavoidably held over until next month.

REMOVAL OF REFUSE.

THE presence of cholera in Egypt, and the possibility of its outbreak in England, has called attention to the importance of enforcing the laws which have already been passed for the protection of public health, many of the provisions of which are in ordinary times more honoured in the breach than in the observance. People have now become alive to the fact that decaying organic matter has a tendency to become a source of disease, and that any accumulation of it is not only offensive but positively dangerous. This knowledge, however, does not enable an individual who is aware of the existence of an offensive accumulation to take the necessary steps to secure its removal, and it may be well to call attention to the powers and duties which are given by law in this respect, so that those who wish to protect themselves may know how to do so.

The Public Health Act, which was passed in the year 1875, provides a code which regulates the sanitary administration of England, and in the main prescribes the powers and duties of the different local authorities. It is not applicable to London, nor to Scotland or Ireland, but each has its own Act, which, for this purpose at any rate, is very similar to the English Act, and, as regards sanitary regulations, the powers and duties to which we here refer are practically the same throughout the United Kingdom.

In urban communities, that is in all populous districts, (1) the refuse which accumulates in streets and public places, and (2) that which accumulates on private premises, has to be removed. The first naturally has to be got rid of by the local authority, who represent the community generally, and do the work on their behalf and at their expense. The refuse from private premises is of different kinds, and has to be removed in different ways. The local authority must provide a proper system of sewers in all towns, and can oblige the occupiers of houses to drain their houses into the sewers; but as regards the solid refuse, which ought not to be sent down the drains, and would stop them up if it was sent, the case is somewhat different. The ordinary house refuse, which usually goes first to the dustbin, *may* be removed by the local authority, at the expense of the general rates, or the occupier of the premises may be required by local by-laws to provide for its removal. Such things as stable manure, and the refuse produced in any trade or manufacture, have to be removed by the occupier of the premises where they are produced, under the liability to a penalty if they remain long enough to become a nuisance. The Local Government Board have a general power of enforcing the performance

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of their duty by a local authority where the health of the district requires it; but, subject to this, it will be seen that the local authority is not in the first instance *obliged* to remove any refuse that cannot be taken away through the sewers. As regards solid refuse there are two questions to be considered. It is often valuable, and the person who produces it in his trade may well prefer to keep it in his own possession and so make a profit out of its removal; on the other hand, removal costs money, and it is often difficult to find a place for the disposal of rubbish. As regards the dustbins of private houses, it is generally best that the local authority should undertake their clearance; the ordinary house occupier has no convenient means of removing his dust, and by-laws requiring him to do so are generally a dead letter, because he can plausibly say he has no place to which to take his dust, and consequently he cannot well be punished for disobeying such by-laws. Trade refuse and stable manure can be sold, and a strict enforcement of by-laws to prevent their becoming a nuisance is generally found sufficient to secure their regular removal.

The cases which usually press are those where individuals are, or fancy they are, aggrieved by the failure of the local authority to do their duty. The commonest case is where the dustmen fail to come to empty the dustbins. Here, if the local authority have undertaken the duty of clearing them, as they have in most towns, the aggrieved householder has a remedy, though an inadequate one. He can write to the inspector of nuisances, or the clerk to the Board, saying he wants his dustbin cleared, and if it is not done within a week after his letter has been written, he may summon the local authority before magistrates, and recover a penalty of five shillings a day for every day during which his dustbin remains unemptied after his notice. The Act gives him no further remedy, but probably he might also recover in the County Court the reasonable expenses of himself having the dustbin cleared. In cases where a person thinks that a nuisance or dangerous accumulation of rubbish exists, not on his own premises, he has two courses open; he may either complain to the local authority of the district and leave them to investigate the matter and to take the necessary steps to have the nuisance removed, or he may himself complain to a justice of the existence of the nuisance, and obtain a summons for its removal. On the hearing of such a summons, obtained at the instance either of an individual or of a local authority, the magistrates, if satisfied that a nuisance exists, have power to order its abatement, and to order anything to be done which may be necessary to prevent its recurrence; they may also impose a penalty for the nuisance which has already existed. The ultimate safeguard for keeping a district free from pestilential collections of rubbish is the power which either the local authority or an aggrieved individual has of invoking the authority of the law to prevent the continuance of a nuisance; but this, of course, can only be done where the nuisance is a bad one. In ordinary cases we must depend on the sanitary inspector and other officers of the local authority doing their duty. They can generally prevent rubbish becoming offensive by removing it themselves, or giving notice to the person responsible to remove it before it has had time to become dangerous. Now that attention has been called to the importance of a prompt removal of all such things, it may be expected that local authorities generally will pay special attention to this part of their duties, and, in cases where this is necessary, will be willing to incur extra expense in order to secure the safety of their district. When they neglect their duty, individuals may sometimes stir them up by applying to the magistrates for summonses, or by memorialising the Local Government Board, but such steps ought seldom to be required.

SUPERVISION OF TENEMENT HOUSES.

THE very strong expression of opinion called forth at the meeting recently held under the auspices of the Charity Organisation Society as to the evils arising from street doors of the lowest class of houses being left open at night, and from want of supervision of such houses, shows how urgently some change in the present regulations concerning them is needed. A report of the meeting will be found at page 57 of this paper.

The whole subject of the dwellings of the poor is a very wide one, and probably some time must elapse before any satisfactory conclusion can be arrived at with regard to it; but certain points are so clear, and the remedies for them so obvious, that when these are applied it cannot but tend to simplify the more difficult parts of the question.

No one doubts the necessity for common lodging-houses being under inspection, and those who know the facts consider such inspection to be equally required in tenement houses inhabited by the same class of people.

The public generally are wholly unaware of the terrible state of things which prevails—not only in remote parts of the East End, but often within a stone's-throw of good streets and squares, and in places so surrounded by respectability that no very great effort could be required to raise the standard of the inhabitants to a level somewhat nearer that of their neighbours.

One definite point demanding immediate attention is the custom of leaving street doors open at night. Sanitary officers—who, from their position, speak with the highest authority—testify to the inconceivable amount of mischief proceeding from this cause, and to the facilities which it offers for overcrowding and horrible immorality.

Different opinions were given (which are fully stated in the discussion on Miss Edith Bullar's paper at p. 57) as to the best mode of supervision, some of the speakers wishing to increase the power of sanitary officers; others, mainly on the ground of the inaction of vestries as at present constituted, desiring that it should be transferred to the police.

The first thing necessary is that the matter should be thoroughly ventilated and brought to the notice of those more immediately concerned.

Certainly the ground landlords as a class would not allow such abuses on their property if they were aware of the magnitude of the evils complained of. It cannot be doubted that when they are made acquainted with the facts they will give their cordial co-operation in bringing about a reform.

As the population increases so does the overcrowding, and all the terrible train of vice consequent upon it; and the longer the delay before facing the question and dealing boldly with it, the greater the difficulty will become.

The injury, both moral and physical, now being

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[illegible] and boys is most truly [illegible] Thorne Thorne as perfectly irre[illegible] but strict and careful super[illegible] It is idle to talk of the duties [illegible] the liberty of the subject when the [illegible] ignorant and depraved to have any [illegible] what their duties are, and where the [illegible] idea of liberty is licence. The better [illegible] now suffering from the ill-conduct of [illegible] would welcome the protection thus [illegible].

We may well hope that the committee proposed by Mr. Morley, and shortly to be appointed, will [illegible] before long for putting a stop to the present melancholy condition of things, which entails so much misery and degradation on a large class of the people; but none the less it behoves all who have any power of action in the matter or any influence on public opinion to exert themselves to remove such a grave social evil—the long neglect of which is a reproach to our humanity—and to strengthen the hands of those on whom devolves the duty of carrying out whatever measures are finally decided on.

THE 'SANITARY JOURNAL OF TORONTO' ON VACCINATION.

IN an article which appears in the *Sanitary Journal* (Toronto) for June 15, Dr. Edward Playter, the editor of that journal, discusses the question 'Is vaccination as important a preventive of small-pox as it is commonly believed to be?' Ostensibly the paper is an impartial examination of the evidence; in effect it is an attempt to minimise as much as possible the value of the evidence in favour of vaccination.

Dr. Playter admits that after the introduction of vaccination the small-pox death-rate largely declined, but he declares there is no evidence of any causal relation between the two facts. He appears to think that the decline is merely the result of a natural law of the disease which has 'great waves or curves' of incidence and mortality. He goes on further to moralise in the following manner:—'It appears that it may be that the particular disease becomes so prevalent and universal that it eventually gives rise in the constitution to a sort of hereditary insusceptibility to itself, for a few generations, when it commences to recede and become at once less frequent and less fatal. Again, it seems probable that the influence or effect upon the system of any one of the epidemic diseases may tend strongly to prevent for a time, long or short according to circumstances, the same organism becoming the subject of small-pox, or indeed of any other of the epidemic diseases.' Now, we are not prepared to deny the existence of a 'hereditary insusceptibility' because there is really no evidence either for or against it. But as regards the assumed 'protective influence' of one epidemic disease against the others, we can most emphatically assert that the assumption is against all evidence. None of the other epidemic diseases (scarlet fever, measles, and the like) afford the smallest protection against small-pox for any period either long or short. The lamentable accidents that ever and anon occur in the fever hospitals of the metropolis, afford only too abundant evidence of the utter groundlessness of this strange hypothesis evolved out of the 'inner consciousness' of a Canadian editor.

It has again and again been pointed out that the decline in the small-pox mortality has been enormously greater than in the mortality of other zymotic diseases, such as measles and whooping-cough. Dr. Playter admits the difference in the behaviour of the two classes and even speaks of an increase in the mortality of the latter, but, he asks, 'May not the increase in the frequency of these diseases have contributed to the decrease in the frequency of small-pox?' (!) Very wisely he abstains from suggesting why or how this comes about.

Dr. Playter is greatly impressed with the possible dangers of vaccination, but in estimating their counteracting value he merely quotes the fact as to the increase in the registered deaths from syphilis, diseases of the skin, and mesenteric disease. He fails to point out how greatly during these years has medical knowledge advanced, and how much more precise is our diagnosis now than it could have been some fifty years ago. As regards syphilis in especial, the advance in knowledge of that disease among the general practitioners throughout the country has been incalculable. Surely it is necessary to take this very important fact into consideration before any conclusion can be drawn.

Space forbids us considering Dr. Playter's paper at greater length, and we shall merely record in conclusion that he admits vaccination has 'a certain amount of protection against small-pox—even greater protection than would be afforded by an attack of scarlet fever or measles.' (!) We regret exceedingly the publication of this paper which is calculated to do an immensity of harm, and we sincerely trust that it will not induce the good people of Toronto to cast aside the only effective protection against the most loathsome and deadly of all infectious diseases.

THE Local Government Board have agreed to the re-appointment of the medical officer of health for the Glanford-Brigg Rural Sanitary district at the reduced salary of 120*l.*, as mentioned in our last, for one year only.

THE Seaford and East Blatchington new Local Board and Urban Sanitary Authority is to consist of nine members. The nominations are to be made by August 25, and if there should be a contest the voting papers are to be delivered on Tuesday, September 4, collected on Saturday, the 8th, and counted on Monday, the 10th, at the Town Hall, Seaford.

THE enactment relating to by-laws as to houses let in lodgings, contained in the 90th section of the Public Health Act, has been declared by the Local Government Board to be in force within the parishes of Caldicot, Portskewett, Lydney, and St. Briavels, in the Chepstow Rural Sanitary district.

THE Auckland Rural Sanitary Authority have received a letter from the Local Government Board objecting to the re-appointment of three of the poor-law district medical officers as medical officers of health, and withdrawing the Government grant of a moiety of their salaries, in future, if re-appointed. The Authority have, therefore, decided to appoint one medical officer of health, not being a poor-law medical officer, at 125*l.* per annum.

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NOTES OF THE MONTH.

IMPROVEMENTS AT NEWCASTLE-ON-TYNE.

At a recent monthly meeting of the Newcastle City Council several sanitary measures involving the expenditure of about 40,000*l.*, were authorised to be proceeded with at once. They include the establishment of baths and washhouses, the laying out of the Ballast Hills old burial-ground as a recreation-ground, and the formation of an extensive sanatorium for foreign cattle. It is also proposed to lay out the Shield-field Green, an open space in the midst of a dense population, as a recreation-ground for the inhabitants. When all the proposed improvements are carried out Newcastle will be able to boast of a greater number of public parks and recreation-grounds than any town of its size in the kingdom, indicating a salutary change in public opinion with regard to sanitary matters.

BUILDING AT GATESHEAD.

The attention of the Town Council of Gateshead was called at their last meeting to the mode of building some houses and walls on the Dutcham Hall Estate and the quality of the bricks used. It appeared that instead of tiled 14-inch outside walls, they were built with apertures filled with rubbish. After inspection by the town clerk and surveyor, they were ordered to be properly built, and notice was given to the builders that on no account would this plan be allowed. The committee also reported that the bricks used were of a most inferior quality, the clay of which they were made being bad and the bricks quite soft and insufficiently burned. Mr. Councillor Lucas said that the 'bricks' shown at the committee meeting were not bricks; they would not bear either weight or heat. If a two-storey wall was built of such material it would tumble down.

SOCIABILITY AND SMALL-POX.

It has been reported to the Town Council of Gateshead that patients in the Small-Pox Hospital there were in the habit when in a convalescent state of talking to their friends over the wall of the hospital, this reprehensible practice accounting for the spread of the disease. It was resolved to take summonses out against persons negligently exposing themselves when suffering from the disease.

HIGH DEATH-RATE AT RAWMARSH.

A remarkably high rate of mortality has been recorded during the present year in the Local Board district of Rawmarsh, near Rotherham. In January the death-rate represented 21·0 per 1,000, in February it rose to 27·5, and in March it rose still higher to 36·5. In April it fell to 29·88, but in May it represented the enormous rate of 40·9. This exceptional mortality has most properly been made the subject of investigation by the health officer, Mr. W. J. Smith, who has prepared a special report with regard to it. He shows that typhoid fever, whooping-cough, measles, and scarlatina have been present in a severe form, and have contributed in a great measure to increase the death-rate. Since January no fewer than 59 cases of typhoid fever, and 10 of an undefined character have occurred, with six deaths. There were 13 deaths from whooping-cough out of 59 children attacked, and measles destroyed 4 lives. Out of 75 cases of scarlatina as many as 15, or 20 per cent., proved fatal. During the first five months of the year no fewer than 260 persons were attacked with zymotic disorders. Mr. Smith appears to have spared no effort to prevent the spread of infection, but his action has been seriously hampered by the absence of a properly appointed sanitary inspector.

WHITE LEAD POISONING.

Another young woman, the victim of lead poisoning, has sought admission to the Gateshead Workhouse. She has been blind of one eye from the effects of lead-poisoning for about a year. A report of the case was sent to the Home Office. The chairman of the Board of Guardians has expressed his satisfaction that the Government is taking this important question into consideration, and his hope that the result would be the issue of more stringent regulations than those now in use for the benefit of workers in white lead factories.

THE TOTTENHAM SANITARY ASSOCIATION.

Established some ten years ago for the diffusion of popular information on sanitary subjects, the Tottenham Sanitary Association has done much for the welfare of the district it supervises, and deserves more support than it seems at present to receive. The ninth report of the committee, which has recently appeared, gives a succinct account of the sanitary operations of the year, an intelligent analysis of the mortality statistics, and a few well-timed comments on the inactivity of the local authority. The erection of a public mortuary is again urged, and, having regard to the rapidly-increasing population of the district, the question of its provision should no longer be delayed by the Authority. Little or no progress has been made with measures for providing swimming and other baths for Tottenham, to which the association has on more than one occasion drawn attention. Reference is made to the provision of these highly-important sanitary adjuncts by other local authorities, and there seems no reason why the Tottenham Board should not follow in their footsteps. In 1881 the committee commented on the absence of arrangements for efficiently flushing the sewers, and in the present report reference is made to their very defective ventilation. During the two years 1881–82 as many as forty-seven deaths were registered from diphtheria in Tottenham. In looking for the cause of this excessive mortality, the committee dismiss the idea of water influence, and consider that the source of the mischief is to be found in defective sewer-ventilation. The death-rate from all causes was unusually high, representing a rate of 18·0 per 1,000 of population, against 16·88 recorded in 1881. From preventable disease a high rate of mortality occurred (4·01 per 1,000), which is especially noticeable from the fact that adjoining districts did not participate in this increased fatality. In Edmonton the death-rate from zymotic causes was only 2·25; in Hornsey, 2·37; and in Stoke Newington, 2·45 per 1,000. These three parishes, and more particularly Edmonton, are closely associated with Tottenham, but they each have a separate system of sewers. The reasons for this difference are worthy of some more exact and systematic study than they appear to have received.

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REFUSE REMOVAL IN DEMERARA.

TOWARDS the close of last year Mr. Luke M. Hill, the town superintendent of Georgetown, Demerara, visited several towns in England and Holland for the purpose of learning the best system of dealing with city refuse, and he has now presented to the local town council a report on his investigation. The Liernur system, as adopted in various parts of Holland and in other cities on the continent, is dismissed as impracticable; for while, as Mr. Hill admits, the system has certainly advantages to recommend it both in convenience and cheapness of working, as well as in absence of all nuisance, the laying down of the necessary iron main pipes on the long lengths of streets in Georgetown, and the erection of a pumping station would be a far too costly undertaking. Nottingham, Leeds, Rochdale, Manchester, Warrington, and Birmingham, were each in turn visited, and the experience gained there by Mr. Hill leads him to strongly recommend the pail system for adoption in his district. This system will, he thinks, entirely free the town from the constantly recurring midden nuisances, which are the subject of constant complaint, and, moreover, it has the advantage of being nearly self-supporting. Mr. Hill estimates that by the adoption of this method he could realise a saving of 3,000 dols. per annum, which, apart from the freedom of nuisance it would ensure, and on which no money value can be placed, is by no means inconsiderable. To get rid of the foul fœtid smells, arising from ground thoroughly saturated with the emptyings of latrine pits, time after time, which is experienced in all parts of Georgetown, especially at night-time, would be an incalculable boon for the health of the city; and the authority should lose no time in putting Mr. Hill's recommendations into effect.

INSURANCE OF INFANTS' LIVES.

THE practice of insuring the lives of infants, which unfortunately appears to be on the increase in various parts of the country, is one open to very grave objection. It is, on the face of it, improper that a parent should have a pecuniary interest in the death of his child; and while there are no facts to show that the practice has led to intentional neglect, there is little doubt that actual neglect often occurs in such cases. Referring to the subject in his report on the Lytham district, the health officer observes that most burial clubs under a certain amount admit members without any medical examination; the consequence being that it becomes an easy matter for the friends of any sick or weakly individual to ensure his or her life in any number of clubs. Overtures are actually made to medical men to curtail the duration of the last illness, so that it may not appear to extend to or beyond the period that the person has been entered upon the books of the club. The agents themselves are certainly not free from blame. One agent in the Lytham district had entered on his own account into no less than three clubs a neighbour—not a relative—whom it was impossible for him not to be aware was at the time in very delicate health. The inquiries made by the representatives of these clubs into the facts of the case, and certificates being forthcoming as to the duration of the affection (heart disease), prevented this speculative individual from reaping the rich harvest he would otherwise have enjoyed.

MR. DOBBS' VICTORY.

LONDONERS have been saved by Mr. Dobbs' energy and public spirit from a grievous wrong. Setting aside as chimerical the proposal made by Mr. Farrer before Sir William Harcourt on the 1st instant that we should go back to the water-ratings of 1852, before the Metropolitan water companies had got their rating powers, it must be obvious to most sensible people that the (annual) value contemplated by the section of the Grand Junction Act in dispute was the nett value, and not the gross value, as the company contended. The noble and learned Lords who heard the appeal of Mr. Dobbs are announced as being unanimously in his favour, though the detailed and formal judgment has not yet been pronounced. We went so fully into the case on a recent occasion that there is no necessity now to do more than to congratulate Mr. Dobbs on the success which has crowned his perseverance. Although the sum in dispute was only 4*l.* per annum, yet it is understood that the Company will lose in the aggregate some 20,000*l.* per annum in consequence of the decision of the House of Lords. No one can affect to regret this, except the Grand Junction shareholders, who are already far from being objects of pity. Sir William Harcourt's trenchant criticisms as to the helplessness of Londoners in matters affecting their common interests are abundantly justified by this case. But for the determination of a private individual not to suffer wrong at the hands of an opulent and powerful company, Londoners might for many years longer have passively groaned under a yoke that would at each assessment become more and more galling and intolerable.

THE NEW YORK SUMMER CORPS.

THIS corps, which is organised to fight with dirt and disease in New York, is composed of fifty physicians, whose duty it is during the hottest weather to make a house-to-house visitation of all the tenement houses in the city. We learn from the *Sanitary Engineer* that this work, which has been in operation about seven years, has proved of great value in reducing the high death-rate and improving the sanitary condition of the tenement house districts. Though the whole city is covered by the fifty districts, it is, of course, in the most crowded portions that the greatest good is done. The physicians employed in the work visit every poor family in their district, distributing circulars of instruction (printed in English and German) to mothers of young children, and of precaution against and directions in case of sunstroke; giving free advice and prescriptions, which are supplied free at the Health Department, or at cost by most druggists in all cases of sickness where no other physician is in attendance; furnishing free tickets for the excursions of the floating hospitals of St. John's Guild, whenever thought desirable, making a necessarily more limited distribution of tickets of admission to the Seaside Sanitarium or nursery of the same organisation (see SANITARY RECORD, vol. xiii. p. 148); and reporting weekly on all cases of sanitary defects or violations which they may discover in the houses and yards or in the streets of their district. They also carry with them a supply of such medicines as are most likely to be of use for giving relief in cases where prompt action is necessary. The good thus done is more than the actual

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number of lives saved by the timely advice or prescription of the physician. 'It is the general expression of those who have previously been in this service,' says Dr. Janes, the Assistant Sanitary Superintendent who has immediate charge of this work, in his report of last summer's results, 'that a gradual improvement is being made in the sanitary condition of the premises visited, as evinced by less sickness and fewer violations of sanitary law. The apparent results of several years' experience is that this service becomes year by year more popular, visits are received with increasing confidence and interest, and the advice given carefully followed.' Last season, in the five weeks' service, nearly 154,000 families were visited, and over 3,600 cases treated, over 23,000 circulars distributed and nearly 5,000 excursion tickets given. Dr. Janes has recommended that the time of this service should be extended from five weeks to two months, and the corps accordingly commenced their duties three weeks earlier than they did last year, but none too soon as proved by a sudden rise in the death-rate of young children during the hot weather experienced in New York during the latter half of June. In the nearly doubled time to which the service is now to be extended, it is hoped and expected that at least a proportionately greater amount of work will be done and of a character fully as high as on previous occasions.

THE CLEANSING OF CAST-IRON WATER-PIPES.

At a recent meeting of the District Association of German Engineers at Carlsruhe (*Builder*, July 21), Herr Merz explained the principles on which the selection of the material for water-pipes should be based. He considered cast-iron the best substance to meet the requirements of the case. Some pipes are not affected by the water which flows through them, while others, after a few years, are so incrusted that it is a question whether they can be used. The deposits consist, for the most part, of oxide of iron and carbonate of lime, and the removal of these incrustations is a fundamental part of any system of water-pipes. Three methods are suggested by Herr Merz for arriving at this result. 1. The removal of the pipes, which are subsequently heated, and from which the incrustations are afterwards scraped. 2. The dissolving of the deposits by means of acids, &c. 3. The mechanical purification of the pipes by the removal of the deposits before they become hardened, scrapers, brushes, &c., being used for this purpose. By the employment of the first method the cost is said to be about two shillings per running yard, being a saving of about 75 per cent. as compared with the expense of new pipes. The second plan (first used by Arcet) costs about the same. The third method was described in a detailed manner by Herr Merz, who exhibited models illustrating its application at Nuremberg and Carlsruhe. A rope or chain is introduced into the portion of the water-pipes which requires cleaning, and by means of this contrivance a brush of a size to correspond with the diameter of the pipe is drawn to and fro until the deposit has been removed. The water is allowed to flow as usual during the operation, so that any particles of the deposit which are dislodged are carried away at once. Herr Merz has devised a brush for use in cases where the pipes bend a good deal. At Carlsruhe the entire water-pipe system has been cleaned by this process, the total length being about 24,000 yards, of a diameter of 3½ in. to 13 in. The operation took seventy-eight days and cost 114*l.*, being at the rate of about 1⅛*d.* per running yard.

HYGIENIC WATERPROOFING.

For some time past the Belgian War Department has conducted a series of experiments at Valvorde, on the waterproofing of soldiers' uniforms by means of liquid alumina. With respect to the hygienic side of the question, the medical authorities have satisfied themselves that the articles of dress thus treated permit the perspiration to pass off freely, and chemical analysis has proved that the preparation used in no way injures the materials, or destroys their colour. More than 10,000 metres (10,936 yards) of materials, re-dressed two or three times over, notwithstanding the rinsing and washing to which they have been subjected after having been soiled, and after constant wear, remained perfectly waterproof. The only drawback to the process appears to be that it is not very economical, and, to ensure the desired result, must be conducted on a large scale, which requires a considerable amount of plant. The following, according to the *Journal d'Hygiène*, is the process employed:—Acetate of alumina is obtained by making solutions of equal parts of alum and acetate of lead in separate vessels, and then mixing them together. Sulphate of lead will be thrown down, leaving acetate of alumina in solution, which must be decanted. The materials to be waterproof are soaked in this solution, and then withdrawn without being wrung, and dried in the air.

DRAINAGE DEFECTS.

Dr. Tripe, the Medical Officer of Health for Hackney, in his report for 1882, writes as follows:—'As some very unusual defects in the drainage of houses have come under my notice during this year, chiefly in connection with cases of diphtheria and typhoid fever, I propose stating them at some length, as well as one or two other instances which have been noted in former years. In one house standing in its own grounds, the drainage arrangements were examined in consequence of a death from typhoid fever. Everything was said to be in good order, but offensive smells had been at times observed. As the house had formerly been drained by a brick drain into a cesspool, it was decided to search for the cesspool, which was found 130 feet from the house, and had not been emptied. The old brick drain was also discovered, and traced to within 13 feet of the house, and as the soil was loose, there is no doubt that the sewer gas was drawn along the course of the old drain into the house. The cesspool was emptied and filled up, and the drain dug up for some distance from the house, since which there has not been any smell observable. At a house in De Beauvoir Road offensive smells were complained of in a bedroom. On being inspected, the cause at first appeared to be incomprehensible, but on the loft over the room being examined, it was found that the stack-pipe instead of being carried outside had been placed in an angle of the wall, and was connected without the intervention of a trap with the drain. The hopper head was in the loft, so that the drain was ventilated directly into the house. At one of the police stations some cases of

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diphtheria occurred, but on a search being made a cesspool, covered with a grating, was found in the yard which had been used as a playground by the affected children. It was of considerable depth, and received not only the yard drainage but the waste water from the kitchen sink. As all the rest of the offices were well drained, the existence of this cesspool was not even suspected, much less known, because from the manner of its construction its contents could not be seen through the grating. Another instance was that of a house, the basement of which was flooded after heavy rains, and as the water was clear and not sewage, it was supposed to have been caused by land springs, but drainage of the basement did not make matters any better. Every effort was made to detect the cause, which remained undiscovered until a deep cutting was made along the garden walk of the adjoining house for the purposes of drainage, when the owner of the first-named house thought that an examination of the ground might give some clue to the dampness of his house. On looking into the trench he saw that a drain had been cut across, and on putting a stick into each end of the drain, he found that it ran in the direction of his house. This was an old field drain, which still drained the adjoining gardens, and had been cut off close to the footings by the workmen when building the house. This drain was connected with the new drain in his neighbour's garden, when the cure was complete. This is the second instance I have known of dampness in houses being caused by field drains having been cut off instead of being connected with the new drains. Many other nuisances also arose from neglect of workmen. Thus a very offensive smell was noticed in a house in which there had been frequent cases of illness, which was attributed by the medical attendant to sewer gas. The smell was most perceptible in a bedroom, and, on taking up the floor boards, an open 2-inch leaden pipe was found. On making inquiry it was ascertained that the former tenant had had a bath in the room, and the plumber had simply contented himself when removing the bath with cutting through the pipe, which was directly connected with the soil-pipe, instead of properly closing it. In another instance the basement of a house was made quite wet by the supply-pipe to a wash-hand basin having been cut off close to the supply-pipe of the house, and imperfectly knocked up, instead of having been properly closed. In another house several inches of water were found under the boards, and as the water was clear and the room half under ground, was supposed to have been caused by a spring. On pulling down the skirting board the wall was found to be damp, as well as the joist in which the floor boards rested. In making a closer examination the under surface of the joist was found to be wet, although nearly a foot above the level of the water. The adjoining premises were therefore examined, when in a gateway leading to the stables, about 1 foot under ground, a defective water supply pipe was found, from which water was continually running.

'Several of the more common causes of offensive smells have been discovered—many in large houses—during the year. For instance, in a clergyman's house, the pupils who used a particular study habitually suffered from headaches, and after a time from low fever. On examination of the house the drainage arrangements of which were most defective, it was found that there was a covered wash-hand basin in the corner of the room, which was connected with the soil pipe, and as the basin was never used the trap was dry, so that it was practically a ventilator for the soil pipe. The most common causes of offensive smells in houses is the use of bell traps in sinks, when the waste pipes are directly connected with the house drains. Great attention has for some time past been paid in this district to the disconnection of sinks from house drains, especially since the appointment of the third inspector of nuisances, as more time can be given to this work without neglecting other equally pressing nuisances. Many instances have also come under notice of nuisances arising from defects in adjoining premises. For instance, sewage was found in the cellar of a well-drained house, and as the party wall was damp, and as the closet pipe belonging to the adjoining house was placed against the party wall, some whitewash was poured down the closet, and escaped from the pipe, which was found to be defective.

'Another very frequent cause of the escape of sewer gas into houses in this district is the defective manner in which connections have been made between the traps and the drains. It was a by no means uncommon practice for some builders, where a pipe did not quite reach as far as the trap, to connect the pipe and trap with brickwork, which the rats displaced, and then got into the houses. In several instances rats have worked under a garden wall, and then under the foundation of the adjoining house into the pantry, and thus afforded a passage for sewer gas from one house to another. Rats have also made their way into houses from the sewer, outside the pipe, in consequence of the eye having been badly put in. I may also mention as an instance of very bad drainage a large house, where all the junctions were at right angles to the main pipes, the pipe from the sink had not been picked up; the waste pipes from the cistern and a wash basin came into an unventilated soil pipe, and were not trapped; the cesspool had not been emptied when the drain pipes were laid down, and the bend of the outlet was irregular. Considerable difficulty was experienced in having every fault remedied, as the workmen covered the pipes over without doing the work properly, and it was only by having them stripped again, and relaid, that the drainage was carried out efficiently. One of the inspectors visited the premises more than a dozen times, and I accompanied him on two occasions.

'The means of drainage and water supply of the houses have been carefully examined in every house where infectious diseases appeared during the year, and all the defects found have been remedied. In almost every instance where diphtheria or typhoid fever occurred the drainage or water supply arrangements were more or less defective, consisting chiefly of the presence of bell traps instead of efficient traps, and of direct communications between the sinks or the rain-water pipes and the house drains. In abating these nuisances the rain-water pipes are not invariably cut off from the house drains, but only in those instances where the hopper heads are near the windows.' These examples of bad drainage and dangerous water-supply are so instructive and unfortunately so common that we feel we are rendering a service to Dr. Tripe's fellow officers of health in drawing their attention to his care and acumen in looking for these fertile sources of disease.

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THE PUBLIC HEALTH
DURING JULY 1883.

THE mean temperature during last month at the Royal Observatory, Greenwich, was 59°·8. It was 1°·8 below the average July temperature in one hundred years, and lower than that recorded in any corresponding month since 1879. An excess of temperature prevailed on nine days of the month, while on each of the other twenty-two days it was below the average. The warmest day of the month was the 2nd, when the mean was as high as 69°·7, and showed an excess of 8°·2; the coldest day was the 15th, when the mean did not exceed 54°·2, and was as much as 9°·2 below the average. Rain was measured at Greenwich on sixteen days during the month, to the aggregate amount of 2·0 inches, which was 0·6 of an inch below the average July rainfall in sixty-one years. During the first seven months of this year the rainfall amounted to 12·2 inches, which was 1·2 inches below the average rainfall in the same period of sixty-one years. The sun was above the horizon during 496·8 hours in July, and 148·7 hours of bright sunshine were recorded at Greenwich; this amount was 19·0 hours below the average in the corresponding month of the five years 1878-82. South-westerly winds prevailed almost throughout the month. The recorded amount of ozone exceeded the average of the corresponding period of recent years, a considerable excess prevailing during the first half of the month.

In the twenty-eight large English towns dealt with in the Registrar-General's Weekly Return, which have an estimated population of more than eight and a half millions of persons, 22,595 births and 13,694 deaths were registered during the four weeks ending July 28. The annual birth-rate, which had been 36·0, 35·0, and 34·7 per 1,000 in the three preceding months, further declined 34·2 during July, and was 0·6 per 1,000 below that which prevailed in the corresponding period of last year. The lowest birth-rates in these twenty-eight towns last month were 25·9 in Norwich, 27·6 in Halifax, and 27·8 in Bradford; in the other towns the rates ranged upwards to 39·6 in Blackburn, 39·8 in Preston, and 40·0 in Sunderland. In London the birth-rate was 33·6 per 1,000, whereas in the twenty-seven provincial towns it averaged 34·7.

The annual death-rate in the twenty-eight towns, which had declined from 26·1 to 21·0 in the four preceding months, further fell during the four weeks of July to 20·7, notwithstanding the greatly increased fatality of diarrhœal diseases; this rate was, however, 1·6 above the exceptionally low rate that prevailed in these towns during July 1882. The lowest annual rate of mortality last month in the twenty-eight towns was 14·0 in Halifax. The rates in the other towns, ranged in order from the lowest, were as follow:—Birkenhead, 14·7; Cardiff, 14·9; Plymouth, 15·3; Brighton, 15·4; Bradford, 15·5; Derby, 15·5; Bristol, 15·8; Norwich, 16·0; Blackburn, 16·7; Wolverhampton, 16·8; Hull, 16·9; Oldham, 17·1; Portsmouth, 17·4; Bolton, 17·8; Leicester, 18·0; Salford, 18·2; Nottingham, 19·0; Huddersfield, 19·1; Birmingham, 19·3; Leeds, 20·1; Sheffield, 20·5; Preston, 21·8; London, 21·9; Liverpool, 23·5; Manchester, 23·8; Newcastle-upon-Tyne, 25 8; and the highest rate during the month 38·0 in Sunderland. The excessive death-rate in the last-mentioned town was caused by the registration during July of the deaths of 177 of the children who lost their lives at the Victoria Theatre in the preceding month. Excluding these deaths, the rate of mortality in Sunderland during the month was only 19·0 per 1,000. While the death-rate in London during July was 21·9, it did not average more than 19·7 in the twenty-seven provincial towns.

The 13,694 deaths from all causes in the twenty-eight towns during the four weeks of July included 1,605 which were referred to diarrhœa, 468 to measles, 324 to scarlet fever, 234 to whooping-cough, 166 to 'fever' (principally enteric), 98 to diphtheria, and 22 to small-pox. In all, 2,917, or 21·3 per cent., of the total deaths resulted from these principal zymotic diseases, equal to an annual rate of 4·4 per 1,000. This zymotic rate in the twenty-eight towns, owing to the increased fatality of diarrhœa, showed a considerable increase upon the rates in recent months, and was 1·0 higher than that which prevailed in the corresponding period of last year. The death-rate from the principal zymotic diseases in London during July was equal to 5·8 per 1,000, and was no less than 2·5 above the average rate in the twenty-seven provincial towns, among which the rate ranged from 0·3 in Wolverhampton, and 0·7 in Plymouth and in Halifax, to 4·9 in Leicester and in Liverpool, and 5·8 in Newcastle-upon-Tyne. Diarrhœa caused the high zymotic death-rate in Leicester, and measles in Liverpool and Newcastle-upon-Tyne.

Diarrhœa was by far the most fatal zymotic disease in the twenty-eight large towns during July. The annual death-rate from this disease in these towns, which had been equal to 0·2 and 0·5 in the two preceding months, further rose to 2·4 during July, which was 1·0 above the rate recorded in the corresponding month of last year, when it did not exceed 1·4 per 1,000. No death was referred to diarrhœa last month in Plymouth, and but one in Wolverhampton and in Halifax; whereas the death-rate ranged upwards in the other towns to 2·3 in Nottingham, 2·7 in Bolton, 3·4 in Preston, 3·6 in London, and 3·8 in Leicester. While the diarrhœa death-rate in the twenty-seven provincial towns did not exceed 1·4 per 1,000, it was, as before stated, as much as 3·6 in London. The death-rate from measles, which had risen in the five preceding months from 0·22 to 0·72, was 0·71 during July; in London the death-rate from this disease was 0·91, whereas in the twenty-seven provincial towns it did not average more than 0·54 per 1,000, but was equal to 1·4 in Liverpool and in Salford, and 3·9 in Newcastle-upon-Tyne. The annual rate of mortality from scarlet fever in the twenty-eight towns, which had been 0·36, 0·44, and 0·49 in the three previous months, was again 0·49 in July; in the corresponding periods of 1881 and 1882 the scarlet fever death-rates in these towns were 0·66 and 0·40 respectively. No deaths from this disease were returned last month in Brighton, Norwich, Plymouth, Birkenhead, Bolton, Huddersfield, Halifax, or Cardiff; in the other towns the death-rates from scarlet fever ranged upwards to 1·3 in Leeds and 1·5 in Sheffield, these two towns having shown each month since the commencement of the current year the highest rates of mortality from scarlet fever. The annual death-rate from whooping-cough in the twenty-eight towns, which had been 0·61 and 0 69 in the corresponding months of 1881 and 1882, was last month only 0·35, and showed a further decline from the rates returned in recent months. In London the death-rate from this disease was 0·39 per 1,000, while in the twenty-seven provincial towns it averaged 0·32 per 1,000, and was equal to 0·6 in Manchester and in Hull, and 0·7 in Liverpool. The rate of mortality from 'fever' (principally enteric), which, during the five preceding months had steadily declined from 0·43 to 0·23 per 1,000, was 0·25 in July. In London the death-rate from fever did not exceed 0·18 per 1,000, whereas in the twenty-seven provincial towns it averaged 0·31, and was equal to 0·8 in Liverpool, and 1·4 in Portsmouth. The death-rate from diphtheria, which had been 0·13 in each of the two preceding months, rose to 0·15 during July. In London the diphtheria death-rate was 0·24 per 1,000, and more than three times that recorded in the provincial towns, which averaged only 0·07. Of the 26 deaths referred to this disease in these provincial towns last month, five occurred in Birmingham, and four in Leeds. Twenty-two fatal cases of small-pox were recorded in the twenty-eight towns during the four weeks of July. Of these, 8 occurred in Birmingham, 7 in London, 4 in Newcastle-upon-Tyne, and 1 in Hull. Judged by the returns of the Metropolitan Asylum Hospitals, the prevalence of small-pox in London last month showed a further marked decline; the number of small-pox patients under treatment in these hospitals,

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which had steadily declined from 90 to 65 at the end of the four preceding months, further fell to 55 at the end of July. The average weekly number of new cases admitted to these hospitals, which in the two previous months had been 10 and 11, was but 6 in July.

The rate of infant mortality in the twenty-eight towns, measured by the proportion of deaths under one year of age to births registered, was equal to 195 per 1,000 during July, against 234 and 163 respectively in the corresponding periods of 1881 and 1882. The proportion of infant mortality in London last month was equal to 241 per 1,000 births, whereas in the twenty-seven provincial towns it did not exceed 156, and ranged from 77 and 88 in Plymouth and Blackburn, to 191 in Norwich, 206 in Preston, and 242 in Leicester. The high rates in the two last-mentioned towns were due to the excessive fatality of summer diarrhœa.

The death-rate from diseases of the respiratory organs, judged by the metropolitan returns, showed a further decline from the rates in recent months. The average weekly number of deaths referred to these diseases in London during July was 179, and thirteen below the corrected weekly average in the corresponding period of the last ten years. The annual death-rate from these diseases in the metropolis, which had been 6·8, 4·2, and 2·8 in the three preceding months, further declined to 2·4 during July. The annual death-rate from these diseases in Liverpool last month was 4·0.

The causes of 290 of the deaths in the twenty-eight towns during the four weeks of July were not certified, either by a registered medical practitioner, or by a coroner. These uncertified deaths were equal to 2·1 per cent. of the total deaths, which corresponded with the unusually low rate in the preceding month. The proportion of uncertified deaths in London was only 1·0 per cent., while it averaged 3·2 in the twenty-seven provincial towns; all the causes of death were duly certified in Plymouth and in Derby throughout the month, whereas the proportion of uncertified deaths was equal to 6·7 per cent. in Preston, 8·6 in Halifax, and 10·9 in Oldham.

Among the population living in the outer ring of suburban districts around London, estimated at rather more than a million persons, the annual death-rate from all causes during July was equal to 16·7 per 1,000, against 18·3 and 14·6 in the corresponding periods of 1881 and 1882. The annual death-rate from the principal zymotic diseases in these suburban districts, which had been 1·7 and 1·6 per 1,000 in the two preceding months, rose to 3·4 in July, owing principally to the prevalence of summer diarrhœa. During the four weeks ending July 28, 143 fatal cases of diarrhœa, 32 of measles, 29 of diphtheria, 27 of whooping-cough, 26 of scarlet fever, 10 of 'fever' (principally enteric), and not one of small-pox, were recorded in the outer ring. The fatality of diarrhœa, as is usual at this season of the year, showed a marked increase; the deaths from measles, scarlet fever, and diphtheria also showed a considerable increase upon those returned in the preceding month. Fourteen fatal cases of whooping-cough, 9 of diphtheria, and 15 of measles were recorded in the district of West Ham; 9 deaths from diphtheria were returned in the district of Edmonton, and 6 from scarlet fever in Epsom sub-district.

THE Tettenhall Lighting district, Staffordshire, has been constituted a Local Government district, with a board of twelve members.

THE Warminster Local Board and Urban Sanitary Authority have passed a resolution by a majority of 10 to 3 to establish public water-works, and appointed a committee to carry it into effect.

PROFESSOR G. M. HUMPHRY, M.D., F.R.S., has accepted the Presidentship of the Congress of the Sanitary Institute of Great Britain, to be held in Glasgow in September next.

SPECIAL REPORTS.

THE BERLIN SANITARY EXHIBITION.

(*Continued from page* 27.)

(FROM OUR SPECIAL REPORTER.)

ANXIETY for the conservation of the human body while yet it has life in it is only exceeded by the interest which the German people, at least so many of them as go to this Exhibition, take in the best means for the more speedily destroying it after death; for the most attractive exhibit, after all, is the dead body burning furnace of Frederick Siemens, of Dresden. It is to be found in an erection in the north-east corner of the Exhibition, close to the entrance from the Lehrter Railway Station, and is somewhat magniloquently described as a chapel-sort-of-pavilion, whereas it more resembles a stuccoed brick-kiln. Constant is the ascent to and speedy is the descent from the upper chamber of this building by means of an external flight of stone steps of those anxious to see the furnace and all its cremating accompaniments, for they are not to be seen except by plans and drawings, they being all out of sight in the basement story; the upper room being but the reception room or chapel to which the corpse is brought in its last enclosure, and laid upon a platform, around which mourners gather. When the last offices of the Church of which the deceased was a member—if he or she had been of any Church—have been said or sung, the platform descends with its burden to a lower chamber, where the light coffin and its contents are propelled on a truck which runs upon rails into the consuming furnace, where it is mechanically hoisted off, and—the truck being withdrawn, and the furnace door closed—it is left to the destruction of the intense heat of combined air and gas of the regenerative system of Frederick Siemens. No smoke nor smell escapes during the process; and the furnace is, as shown by a variety of plans and drawings, adapted to a number of manufacturing chemical and other processes, which are usually destructive of the vegetable and, in some degree, of the animal life of the neighbourhood in which they are carried on. More especially has it been successfully applied to the more noxious processes of the great soda-making industry.

This body consuming furnace at the Exhibition is the direct counter-part of one which has been and is still in use at Gotha, the only principality of the German Empire in which cremation is legal. There it is carried out in great state and order by Government functionaries. Rules, regulations, fees, and such services as may be consonant with the religious profession of the deceased or the wish of those responsible for the last rites to the remains, are duly provided for; and there, adjacent to the cremation chapel, is a chamber which does duty for a burial-ground, by providing, in the shape of an urn, grave and tomb for the ashes of the cremated individual. There they may remain epitaphed and undisturbed for twenty years, but after that lapse of time, should the space they occupy be required for the inurning of the cremated remains of other defuncts, the authorities may remove them and have them decently buried.

The first body cremated at Gotha was placed in Frederick Siemens' furnace on Dec. 10, 1878, and up to the like date of the year 1882 the bodies of 100 persons had been cremated, 87 being those of Germans, and 13 of other nationalities. Of the former, Coburg-Gotha contributed 30; Prussia, 18; Saxony, 15; Bavaria, 13; Weimar, 3; Hamburg, 2; and Anhalt, Baden, Hesse, Lubeck, Meiningen, and Wurtemburg, 1 each. Of the bodies from abroad, 5 were from Austria and 5 from the United States, while England, France, and Russia each contributed one. Seventy-five of the bodies were those of men and 25 of women. Of the masculines, 25 were the remains of independent gentlemen, 19 of persons who had been engaged in trade and commerce, 7 those of Government officials, 11 physicians, 10 of other profes-

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sions, and 4 were those of youths. Of womankind, 6 were the bodies of wives and eight those of widows, the remainder being those of unmarried ladies. Of the 100 bodies only 13 were those of persons of whom nothing is recorded as to their religious belief, 70 being registered as Protestants, 12 as Catholics, and 5 as Israelites.

Elsewhere than in Coburg-Gotha, Germany does not, it would seem, allow cremation, it being understood that the police are opposed to it as destroying an important clue as to the cause of death, but there exists at Berlin a Cremation Association 257 members strong, with corresponding members in England, the United States, Italy, South America, Sweden, Denmark, and elsewhere, which makes arrangements for cremation at Gotha. The last financial report of the association showed a balance in hand of 1,335 marks 47 pfennigs, and expressed a belief that the time was drawing near when the surplus might be used towards meeting the expense of erecting a cremation furnace and appliances in Berlin, since the agitation for the recognition of the birthright of every German to do what he liked with his own body was making visible progress.

The Association has an exhibit in the main exhibition building, which shows, in addition to urns of all sorts testifying by their calcined bones to the anxiety of the members to get rid of their bodies when once their life is extinct, their anxiety to conserve them as long as there may be life in them by preventing, until cremation renders it impossible, the possibility of being killed by being buried alive. Discourses and discussions have taken place at the Society's meetings for the purpose of proving how horribly possible is such a contingency, especially in Germany, where no corpse must remain above ground more than four days from the time of death. The Society is agitating for an extension of time, and meantime is busy with methods and plans, of which several are shown, for keeping alive when they return to consciousness, those who are only apparently dead, but who have been buried as having actually departed this life. Dr. A. B. Strauss, of Schweidnitz, in Schleswig, has patented such a method, and shows his invention as a separate exhibit. In the lid of the large roomy *sarg*, or coffin, in which the Germans place the body of their dead, there is fixed a tube, the upper end of which remains above ground when *sarg* and body are buried. This ventilates the coffin, a spirit lamp, mechanically supplied, withdrawing and cleansing by combustion the foul air. At the top of the tube is placed a bell, which is set in motion by the slightest movement within the *sarg*, and keeps ringing for several days. As the cost of this apparatus is from 2*l.* 10*s.* to 7*l.* 10*s.*, it is clear that only they who have wealth to which to revive, can hope to escape a premature grave; for the poor there is no such resurrection.

There is plenty of evidence, too, in the main exhibition building, and outside of it, that however anxious the Germans may be to burn bodies after death, they are skilfully desirous of providing means for the prevention of their being burnt while alive. The most popular of the many parts that go to the making up of the whole of Krupp's exhibit described in my first notice, is a large model of the fire brigade formed by his workmen, in full costume, actively employed with all their implements and engines for rescue and extinction, in front of a blazing house. Outside, in front of a skeleton house that can be made to blaze but not consume, such a scene may be seen, once or twice a week, as nearly as possible in real life, the City Fire Brigade, or any other such players of any other German locality anxious to make an exhibition of themselves, being the performers. Near that house, every day and all day long, crowds gather in the open, before a very handsome plate-glass glazed stage front, showing the scene of a luxuriously furnished drawing-room. By the lordly mantel, upon a chair, there sits the sleeping figure of a beautiful woman, richly and elegantly dressed in a long trained robe of ordinarily most inflammable material. She has returned from a ball or party, or, as mistress of the house, has bidden 'good night' to the last of a numerous party she has herself been entertaining, and has dropped, worn out, upon the chair and there fallen asleep. Her right arm, in spreading forth unconsciously to herself upon the table, has overturned the lamp, the burning wick and oil of which are all ablaze amid the broken metal and glass upon her train. But that burns not, and though the flames (fed and maintained by gas) burn on hour after hour, day after day, neither dress, carpet, nor aught of what usually in such circumstances goes to the feeding of a conflagration, catches light, for all have been prepared—impregnated with the non-inflammable preparation or mixture made by the exhibitor of this extremely sensational exhibit—Judlin, the proprietor of great dyeing, printing, and chemical washing works at Charlottenburg. That the public may judge for themselves of the efficacy of this preparation, slips of paper, cloth, and wood that have been dipped into it, and give no coloured or other surface evidence of the bath they have undergone, are plenteously distributed, placed in the daintiest of prospectuses, printed and illustrated with delicately tinted and coloured inks, picturing the extensive and effective machinery with which the works are supplied, and setting forth the great extent and compass of their operations.

Close by, there is hung before another stage the sheet-iron curtain, or rather partition, now made obligatory in German theatres, but which seems rather too heavy and clumsy for prompt action in sudden emergency. There are numerous other provisions of iron sheetings, bars, roofs and pillars in place of inflammable materials, ingenious and far-seeing enough, but still leaving untouched the fact made patent by too many a great conflagration, that the great heat of a great fire will penetrate this very iron and make it all but valueless. It is not the plates of which the iron safe is formed that protects its valuable contents from the flames, but the non-conducting powder placed between the plates.

So we go back to powder, and find plenty of various kinds and sorts to be put into extincteurs, or already put there, by competing exhibitors. Mallet & Suntheimer, of Augsburg, have a good show of handy and easily-worked extincteurs, the potency of which is dependent upon the use of their 'Securitas' powder. Not so handy are the extincteurs shown by the Brothers Talgs, of Berlin, though they are doubtless better fitted for their secondary and more constant use as projectors of water over gardens. T. van Trotha, of Gänsefurth, in Anhalt, exhibits an extincteur powder packed in cartridge-like receptacles, the contents of one of which, mixed with a plenteous amount of water and projected upon a conflagration, quickly extinguish it, so that, if this be so, a good garden-syringe, timely used, may prove as good as a fire-engine.

Of fire-engines there is a good show, most, especially the best of them, founded upon English models but not equal to pattern. Körting Brothers, of Hanover, show on a large scale the application of the pulsometer for projecting large and rapid streams of water on to burning masses; and have erected a very handsome pavilion in which they exhibit the many useful applications of this powerful apparatus; but such exhibition is nowhere more pleasing or effective, to say nothing of refreshing, than in the fine cascade that falls from the height on which the pavilion is placed. Fire-escapes are numerous enough, but not very novel. Joseph Reichenberg, a Bohemian manufacturer of fire-brigade helmets and arms, relies altogether upon the old-fashioned sheet used in several new-fashioned ways. It may be held, as of old, by many hands for those fire-pursued to leap into from upper windows; or fastened to a roller at each end, one roller may be carried up and fastened to the ledge of the window, and the other end carried to the opposite footpath, so as to make a broad incline, down which many may safely come; or, if the street be not wide enough for this purpose, then the sides of the sheet may be strapped together and form such a shape that one may leap into it and find the fall safely broken at the bottom.

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Among the greater and the more curious novelties is a patent cigar cap, to enable the German to continue the smoking of his indispensable cigar under circumstances and varied surroundings where the enjoyment of such a gratification would otherwise be perilous. The inventor of this security against fire is no other than the Burgomaster of Kotzenau, in Schleswig. De Brohme & Co., of Hanover, exhibit a soluble glass composition for impregnating inflammable substances, and thereby rendering them uninflammable; while Paul Hoseman, of Berlin, claims that the same effect may be produced by the use of his Vegetable Lime Preparation, which may also as efficaciously be laid on with paint without affecting the colour or appearance of the paint, and so render walls and ceilings fireproof and handsome at the same time. Joseph Kreittmayer, of Munich, shows another composition that may be used in a similar manner to like effect; while B. Von Leer, of Amersfoot, in Holland, exhibits through his Berlin agent, hair carpets that will not burn.

From fire to water is an easy transition, and the absence of the cleansing element in the shape of baths even for the well-to-do in Germany is remarkable. I have shown how large establishments like those of Krupp and Spindler are careful to provide such necessaries for their workpeople; but there is a growing feeling that the municipalities and governments of other localities ought to do something to imitate this country in providing baths for the people. That feeling has found practical expression in this exhibition in the shape of a bath for the purpose of showing that the provision of warm or shower baths at the cost of ten pfennigs, or about a penny farthing each, can be made to pay. It is an iron building erected with utter disregard to ornament, having on one side five baths for men and five on the other for women, with the machinery and appliances for supplying hot and cold water at will. Each bather is provided with two towels and soap, and though one could hardly have expected it in the midst of such an exhibition, the business done by this, in Germany, unique establishment pays its way, and it is hoped will pave the way for the provision of a better state of things in a country that has hitherto belied that portion of its proverbial philosophy which says, 'Cleanliness is half a life.'

The number of exhibits of means for saving life at sea and from drowning in inland waters are numerous, and several of them novel and highly interesting. What I may term the Lifeboat Association, which has its seat at Bremen, makes a capital show of boats and apparatus; but the more remarkable lifeboat shown is one built by H. Havighorst, of Rönnerbeck, of Francis's patent fluked galvanised iron, and supplied with sails and rudder. It is claimed that the greater lightness of a boat of such material renders its transport more easy and expeditious, while its greater strength and stability make it better able to float well and less likely to capsize in heavy seas. It is also held that it is less likely to be damaged by atmospheric influences. It is built without a keel, but at each end there is a gradually widening key sole, so that, should the boat come upon a shallow, it may remain upright and be washed off instead of capsized by the next sea. The place of the keel is supplied by an ingenious arrangement and very seaman-like provision for the working of a centre board. The rudder is furnished with a sheet iron envelope which can be made to descend much lower than the rudder itself, so that when the rudder is lifted out of the water by a heavy sea, the iron may take its place. When the seas rise so heavily that this contrivance fails, what is called a *lenzsack* is resorted to at the other end of the boat. It is a sack made of stout sail cloth fashioned in the form of a sugar loaf, having a rope of cable strength attached to the mouth, and a thinner rope or cord to the other end. When this sack is thrown into the sea with the stout rope tight and the other loose, the sack fills with water, and is a strong body to pull against and keep the boat right. When such a resistance is no longer necessary, it is only needful to tighten the lighter and loosen the stouter rope for the seas to turn the sack round, press out its water, and make it to be easily drawn on board. Among the very complete furnishing with saving apparatus of this boat are mechanical contrivances for casting lines to a wreck alongside of which the boat cannot get, and of making light and signals in darkness.

Close by, built of like material is a sea lifeboat, built by O. Kirchhoff, of Stralsund. Such a boat is very necessary on the sea coasts of Northern Germany, where in winter fishermen are likely to be endangered even at the very mouths of harbours by sudden floes of ice or by sudden storms. Admirably and ingeniously constructed is this boat for this purpose, easily transportable on land, water, or ice, and fitted with every needful appliance and restorative.

Another exhibit is one which would be a blessing if it were copied at this season on the shore of every sea-bathing resort in Great Britain and Wales. On a large wood hoarding on lengthy posts for firm fixture in the ground, are lightly hung, so that they may be removed in a second when need calls, circles of canvas-covered corks, ropes having a heavy wooden ball or bullet at one end, a pair of long poles crooked at one end, a cork jacket, and a speaking trumpet. The rings and the ropes may be thrown to a drowning person, or any one ignorant of the art of swimming may safely take them out to the rescue, while through the speaking trumpet any cool and capable person from the shore may give saving advice to the bewildered and sinking creature in the water. The Germans, however, attach more importance to the poles under such circumstances from the fact, that most bathing fatalities arise from a bather unable or ill-able to swim, getting out of his depth and 'losing his head' from finding it go under water. Under such circumstances the least assistance, if it reach him in time, would draw him in a moment to a safe footing, and this could be done by the bath-attendant or any one stretching out one of the poles to him, and pulling him to the shallower part of the shore. The bathing-machine proprietors are to be responsible for hanging up the saving appliances in the morning before bathing hours and removing them at night, and for exercising themselves and their servants in their use; and when the bathing season is over, the board and its belongings may be safely housed until next season. On the centre of the board are posted clearly printed instructions for recovering the apparently drowned.

(To be continued.)

THE NEW SHOW-ROOMS AND FOUNDRY OF THE WILSON ENGINEERING COMPANY.

THIS company, who commenced business only about four years since for working the patents of Mr. Wilson, in connection with kitchen ranges and other appliances at Pear Tree Street, Clerkenwell, have made very rapid progress in the comparatively short time that they have been established. Shortly after the opening of the factory it was found necessary to supplement it with show-rooms in a leading thoroughfare, and 247 High Holborn was secured for this purpose. Until recently the castings for their various apparatus have been made in Shrewsbury, the work of fitting together and finishing only having been performed in London, which is customary with all manufacturers of cooking apparatus in the metropolis. The advantages, however, of a foundry are so paramount that the directors, under the advice of Mr. Wilson, determined to cast the whole of their work in London, and to carry out this idea the factory at Pear Tree Street has been enlarged, and a foundry established. Although it has been at work but a few weeks, the advantages are proving so great in accelerating the business of the firm that they report a large addition to their trade, mainly owing to the facility with which they are enabled to complete extensive export orders, formerly often blocked while waiting for the arrival of castings. The foundry is fitted up with most ap-

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proved appliances, and the system of 'plate' moulding is largely introduced for such work as it is applicable to. Without troubling our readers with a detailed description of this process, it may be stated that it greatly facilitates the output of work, makes remarkably clear castings, and tends alike to the advantage of both master and workman. The 'Wilson' kitchener is so well known to most of our readers, and has so often been described in the SANITARY RECORD, that another detailed description would be superfluous. It is sufficient to say that this range is built upon smoke-consuming and fuel-economising principles, is largely in use in all parts of the world, and has been awarded eight prize medals up to the present time. The increase of the business of the firm has also necessitated increased showroom accommodation, and larger premises have been taken at 227 High Holborn, where the various productions of the company can be seen, and which will be the largest show room of the kind in London.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

THE twenty-second annual meeting of the North British Association of Gas Managers was held on July 19 in Stirling. Mr. Thomas Whimster, Perth, president of the association, occupied the chair.

In his inaugural address he referred to the great progress which had been made within the past thirty years in the manufacture and distribution of gas. At the earlier date gasworks were much of the description of secret works; but now a satisfactory change had been introduced, and gasworks were amongst the most thriving industries of the time. Referring to the electric light, he said that while it might with improvements attain a field of its own, as a competitor with gas it had signally failed. The complete control established in the use of gas, its cheapness, and its assured progress in reduced cost, its safety, its constant supply and absolute reliability, would insure its place as a friend of the rich man as well as the poor. The very faults of gas as an illuminant were being utilised. For it might be safely predicted of gas that it would yet unravel the mysteries and cure the defects of ventilation. Already the products of combustion were being removed from our sitting-rooms by means of the gas flame, and thus the supply of fresh air would be regulated. The same might be done in churches and large buildings. But he could not speak in the same commendatory way of heating by gas. It was estimated that about 80 per cent. of the heat from a coal fire in an ordinary grate escapes through the chimney, and the idea of using gas with such results could not be considered satisfactory. The association ought not by their approval to sanction such waste. If gas were to be used for warming our houses there must be some better mode of applying it. Where gas could be had at a reasonable price it was universally used for the purpose of illumination, and in all likelihood would continue to be so used. It was fast approaching the same position for cooking purposes, and its many advantages as a heat and power generator justified them in regarding it as likely to take the place of coal almost entirely in the not distant future. The invention and improvement of apparatus for its application in every direction was most encouraging, almost exciting, and the rapid advance which was being made in the production of valuable compounds from what had hitherto been called secondary or bye-products, was steadily increasing in cost.

Mr. James M'Crae, Dundee, read a paper on the 'Desirableness of gas companies and corporations letting out on hire gas stoves for cooking and heating, together with a few details in connection with the working of different stoves.' He mentioned that about a year and a half ago the commissioners of Dundee resolved to let stoves out on hire, and they opened a show-room in a central part of the town with the view of popularising the use of gas. It was difficult to fix upon a particular make of stoves to recommend to the public. They had stoves by English makers on the Bunsen principle, and stoves from Messrs. Waddell and Main, in Glasgow, on the white flame principle. The stoves of the latter firm, in the opinion of Mr. M'Crae, were the best in the market at the present time. They took readily with the public, and had in every case given the utmost satisfaction. It must be gratifying to that firm to know that out of the hundreds of their stoves fixed in Dundee not one of them had been returned as defective or insufficient. He was decidedly adverse to the Bunsen burner stove, because it did not cook so well or so rapidly as the white flame; there was liability to smell where the products were not carried outside, and there was liability to fire back. He further argued that better results were obtained from the use of rich gas than with poor gas, and then went on to say that, assuming all the 304 stoves out on hire on June 19 had been at work for one year, as the most of them had been, the quantity of gas consumed would be 3,801,000 cubic feet. Up to June 19, 231 stoves, consisting chiefly of Fletcher's various solid-flame burners, together with gas fires from different makers had been hired out. Averaging these at 6,000 cubic feet each per annum, they increased the quantity of gas sold by 1,386,000 cubic feet, and which, added to the above figure, gave a total of 5,187,000 cubic feet sold for purposes of cooking and heating, which he considered encouraging.

A discussion followed on this paper, in which it was clearly pointed out that when once a householder obtained a gas stove he was not likely to part with it.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS.

THE annual meeting of this Association took place at Oxford on June 28, 29, and 30, when, after some prefatory remarks, Mr. W. H. White, M. Inst. C.E., thus addressed the meeting* :—

The Council has lately caused to be circulated a list of subjects on which communications are invited, and I would suggest the addition of the following to the list before given, viz. :—Setting out of Works underground, Subsoil Drainage (urban and agricultural), Public Bathing Places, Public Cemeteries, Hospitals for Infectious Diseases, and Appliances for Disinfecting.

I will therefore proceed to describe those local works on which your judgment is invited.

The district of the Oxford Local Board covers an area of 3,540 acres, more than one-third of this area being below flood level. The length of streets and roads repairable by the Local Board within the district is 35½ miles, 29¾ miles of which are macadamised, and 5¾ miles paved. The Board also repairs eight miles of macadamised roads outside the district. There are two miles of private streets within the district. The number of dwelling-houses is 8,000, the estimated population is 41,000, and the rateable value is 196,699*l*. The increase under these respective heads since I entered upon my office in 1871 has been approximately as under :—

In area of district	12 per cent.
In length of streets and roads repairable by the Local Board (within the district)	54 ,,
In ditto, if the roads outside the district are included in the calculation	88 ,,
In number of dwelling-houses	30 ,,
In population	24 ,,
In rateable value	54 ,,

The principal materials used here for macadamised roads are :—

Hartshill stone, which costs, broken to 2in. gauge, and delivered on the road	9*s.* 6*d.* per to .
Clee Hill granite	14*s.* 3*d.* ,,
Stony Stanton granite	12*s.* 9*d.* ,,
Mendip limestone	9*s.* 3*d.* ,,
Local limestone	5*s.* 6*d.* ,,

The cost of new roads made to the requirements of] Board, *i.e.* a foundation of local stone on edge pitching, a

* Condensed from the address delivered by Mr. W. H. White, Inst. C.E.

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3 inch coating of broken local stone, a similar coating of Hartshill stone, gravelling, rolling, &c., varies from 3*s.* to 3*s.* 3*d.* per superficial yard.

For the paved roads the following are generally used :—

Stony Stanton, 4in. by 4in. setts, the cost of which, laid, but exclusive of concrete foundation is	7*s.* 0*d.*	per yard super.
Rowley, 4in. by 4in. setts	6*s.* 6*d.*	,,
Ditto, 4in. by 5in. setts	6*s.* 9*d.*	,,
Wycombe, 4in. by 4in. setts	5*s.* 6*d.*	,,
Stony Stanton randoms	4*s.* 9*d.*	,,
Cement concrete foundation, 4½in. thick, costs (laid)	2*s.* 3*d.*	,,

For foot pavements :—

2½ in. York flagging, which costs (laid)	7*s.* 0*d.*	per yard super.
2½ in. concrete slab paving	3*s.* 0*d.*	,,
2in. blue brick paving	3*s.* 0*d.*	,,
3in. tar paving	1*s.* 6*d.*	,,

The principal works I have carried out in Oxford have been the main drainage and the widening of Magdalen Bridge, the latter work being still incomplete. At a meeting here of the Home and Midland Sections of the Association on February 18, 1876, I gave an account of the drainage works then in progress, which did not include the pumping station, rising main, and irrigation works. Before proceeding to describe these last-named works, I wish to add a few facts to, and make certain corrections in, the Paper of 1876 :—

1. It may be interesting to state that the mode of sewer construction therein described has proved very successful in excluding the subsoil water from the twelve or thirteen miles of sewers laid in water-logged soil. The main sewers are practically watertight under all conditions, but in times of high flood a large quantity of water gets in through the old house drains connected with the sewers in the low-lying parts of the city.

2. On account of the rapid growth within the district, and the connection of places outside it, the length of main sewers and surface drains in the system was eventually 45 miles, instead of 32¾ miles, as stated in 1876.

3. By reason of the reduction of 'waste' effected by the Water Works management, the dry weather flow of sewage was reduced from 2 millions to about 1¼ million gallons per diem.

4. The quantity of land purchased by the Board was in the end 369 acres, instead of 320 acres as stated in the Paper in question.

The site of the pumping station is one recommended in 1872 by Mr. Bailey Denton, who, it was agreed, should be called in to settle this special point, which had been long in dispute, and which was 'blocking' the progress of the whole scheme.

The buildings comprise engine and boiler houses, coal-shed, two dwelling-houses, smithy, stable and coach-house, and stores. The pumping power consists of two single-cylinder beam engines, working independently of each other, and four Cornish boilers. The cylinders are 30 and 3-16ths inches in diameter and 6 feet stroke, and are fitted with Mather and Platt's patent pistons. The beams, which are cast in halves, are 24 ft. 4½ in. long between extreme centres, 48 in. deep in the centre, and weigh 13½ tons each. Each beam is fitted with a pendulum counter. The fly-wheels are 18 ft. diameter, and weigh 14 tons each. The main pumps are double-acting 'bucket and ram' pumps. The buckets and rams are respectively 38 in. and 27 in. in diameter. The pump stroke is 3 ft., and the quantity lifted by each complete 'up and down' stroke is 150 gallons. The buckets and suction valves are 'Thomson and Porter's.' The boilers are cylindrical, 6 ft. in diameter and 24 ft. long. Each has one internal tube, 3 ft. in diameter, stiffened with 'Galloway' conical pipes. Each boiler has two 2-in. safety valves, one of which would also blow off at low water, and there is a 6 in. safety valve on the steam chest, common to all the boilers, and weighted to blow off at 37½ lbs. per square inch. A donkey engine is fixed in the boiler-house, for filling boilers or cold water cisterns, independently of the main engines. The feed-water is taken from the river, which is at a distance of 150 yards from the engine-house, and the waste from the cold cisterns returns to the river. The engines are usually worked at 14 strokes per minute. One engine running at this speed gives off, on an average of the day's work, 55⅝ indicated horse-power, which may be thus apportioned (if the gauge readings can be depended upon)—

Due to actual lift of 2,100 gallons, 54 feet high per minute	34⅜ H.P.
Due to friction of machinery	6¼ H.P.
Due to friction in rising main	14⅜ H.P.
Total	55½ H.P.

When both engines are running each gives off an average of 63½ I.H.P., which according to the readings would be thus divided :—

Actual lift, as above	34⅜ H.P.
Friction of machinery	8⅛ H.P.
Friction in rising main	21 H.P.
	63½ H.P.

It will be found that the figures given for friction in rising main are much in excess of those that would be obtained by calculating the theoretical 'loss of head due to friction.' This may perhaps be partly accounted for by partial silting up of the main in the low places, but even after making ample allowance for this and other causes of difference, there remains enough discrepancy to show that for practical purposes it is not safe to put implicit trust in formulæ. In dry weather one engine pumps out the sewage in ten or eleven hours, including occasional stoppages, but on the other hand, in wet weather, when the flood is out, both engines have to work continuously to keep the sewage down. These fluctuations being so great, it is difficult to give reliable information as to the 'duty' performed by the engines on an average, but when working under favourable conditions the 'duty' is as under—

One engine working singly – 74,000,000 foot pounds per cwt. of Welsh coal.
Each engine when working together—64,000,000 foot pounds per cwt. of Welsh coal.

The foundations of the engine house and chimney shaft gave some trouble on account of the subsoil water and the instability of the ground, which consisted largely of running sand. The cutting was rather interesting from a geological point of view, as some distance from the surface it exposed what appeared to be two beds of river silt, with peat and soft clay intervening. The Oxford clay was ultimately reached, and was found to be dipping rapidly. It was stepped out to an average depth of 32 feet below the present engine house floor, and the whole area was covered with cement concrete of 5½ feet average thickness, before beginning the brick work. The temporary pumping of the subsoil water withdrew so much silt and sand that settlements occurred at some distance from the buildings, the river walls were cracked in several places, and other damage done. The chimney shaft is 96 feet high from the raised ground level to the top of railing. It stands upon a cement concrete foundation of pyramidal shape, 20 feet square at base. The shaft batters at the rate of one in 192, and the brick work diminishes in thickness from 3 feet 4½ inches at bottom to 1 foot 1½ inches at top. The brick work in the engine house up to floor level is in cement, and the whole of the other brick work is in Lias mortar. About 13,000 cubic yards of earth, mostly dredged from the river, were used to raise the site above flood level. In the design of the pumping engines and buildings only I had the advantage of being associated with Mr. T. Hawksley, P. Pres. Inst. C.E., but the execution of the work was in my own hands.

The rising main is 24 inches in diameter, and 2,570 yards in length. Stone's automatic air valves are fixed at the intermediate summits, and provision is made for emptying the main in sections by sluice valves and 4-inch branches at the bottom of each depression.

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Of 369 acres of land purchased by the Board, 330 acres constitute the actual Sewage Farm, the whole of the land on the north side of the railway, and a small portion in the extreme south-east corner (see plan) being cultivated as an ordinary farm. Of the Sewage Farm proper 64 acres are permanent pasture, 226 acres arable, 28 acres are filter beds, and 12 acres are taken up by homesteads, roads, streams, reservoir works, &c. The farm is situate geologically upon the Calcareous Grit, Coralline Oolite and Kimmeridge Clay. About two-thirds of the land is light and sandy, but in the low grounds, near the streams, a deposit of peat overlies the sand. The remaining third is stiff in character, varying from marl to a dense clay, about 45 acres of this being, in my opinion, altogether unfit for sewage utilisation. The land was so water-logged that the whole had to be under-drained, the drains being laid from 3 ft. to 6 ft. deep, 22 ft. to 66 ft. apart, and from 2 in. to 15 in. in diameter. At the outlets of the main drains into the streams the pipes were carried through walls of concrete, and they were protected against the entrance of rats, &c., by galvanised back flaps. The filter beds were specially drained to a depth of 7 ft. or 8 ft. by drains 33 ft. apart. In these and in a few of the deeper drain trenches in other parts of the farm a good deal of rock had to be excavated. The average cost of the land drainage, as described, was nearly 9*l.* per acre. For the more complete drainage of the subsoil, and also to economise land, the various streams—which were very circuitous and shallow—were straightened and deepened, and in a few cases their water was diverted through pipes from one point to another. It is estimated that the sub-soil drainage and other works above-mentioned, the filling in of ditches, grubbing of fences, &c., reclaimed to cultivation from 25 to 30 acres of waste land. The cuttings disclosed several Roman kilns and a quantity of pottery, and in the peat were found shells, and bones of deer, pig, cow, horse, and dog. Near the dwelling-house, which it is said was once a monastic institution of some kind, were found human skeletons. These were, of course, of much more recent date than the relics before mentioned, and lay in uncomfortable proximity to the domestic well. About 5½ miles of new roads were made and the existing roads metalled, and the streams were bridged in many places to improve the communication between what had before been separate holdings. The roads were made with stone quarried on the farm, and cost about 300*l.* per mile. The surface of the land being very irregular (see contour map) no attempt was made—except in the case of the filter beds, hereafter described—to bring it to the smoothness you have seen on many farms. Still a great deal of money was spent even in reducing the greater irregularities, so as to enable the earth distributing carriers to follow a fairly direct course. The ground for the filter beds was levelled at considerable cost, a good deal of rock having to be taken out in places. The beds marked A B C D and E on the plan exhibited were laid out to a fall of about 1 in 600 in the direction of the main carriers, and about 1 in 1,000 in the direction of the furrows. As, however, sufficient land could not be found in one place level enough to lay out in this manner the full area of filter beds considered necessary without an expenditure I did not feel justified in recommending, I devised a plan for the beds marked on plan F G H and I, which, as far as I am aware, had not before been adopted. The surface, which was on a quick slope, was only so far modified as to allow of the furrows being formed pretty regularly at about right angles to the slope, and for the proper gradient to be given them. The main carriers were laid nearly level on embankments down the line of slope, the side slopes of the embankments being about 1 in 5, and well turfed. The sewage being admitted into the carrier, and regulated therein by sheet iron stops, according to the quantity being used, is made to flow in a thin stream over the sides of the carrier along its whole length. The sewage trickles down the side slopes, and thence enters and flows along the furrows, as required. It was difficult at first to prevent it overflowing from furrow to furrow down the slope of the bed, and thus washing the earth away, but a short experience enabled those in charge to control it. On the beds marked H and I, where the natural slope is exceptionally quick, these embanked carriers are divided into two sections, connected by a vertical fall down a concrete shaft. The sewage is brought to the filter beds and to a meadow adjoining them from the tank into which the rising main discharges, by 12-inch iron pipes, which have a fall enabling them to carry the sewage pumped by one engine. The velocity is checked by passing the sewage over a small concrete weir before admitting it to the carriers. These carriers are open, and are formed of concrete slabs, fitted together and held in position by notched flat-iron bars. (See detailed drawing.) The carriers (except those on embankments before mentioned) are divided into sections, and the flow of sewage is regulated by wooden sluices, working in fixed frames. The overflow into the furrows is through rectangular openings in the sides, furnished with small wooden stops working in grooves in the concrete. The sewage is syphoned under the roads to the beds on other side by stoneware pipes surrounded with concrete, and leading into small concrete shafts, from which it is worked by wooden stops. The sewage for the other parts of the farm passes from the tank before mentioned for a short distance along a concrete carrier on embankment, from the end of which a cast-iron main, partly of 18-inch and partly of 15-inch pipes, makes a half circuit of the farm. From this main there are short branches of 15-inch, 12-inch, and 9-inch, worked by sluice valves. From the iron pipes the sewage passes into stoneware pipes jointed with cement, and laid about 2 feet 6 inches deep. On these lines of pipe are brick shafts, with grooves for sheet-iron stops, and overflow notches, also with grooves and sheet-iron stops. At all junctions of two or more lines of pipe, and at other points where an absolutely watertight stop is needed, galvanised iron tide-flaps with ground faces are substituted for the sheet-iron sluices. The sewage overflows from the brick shafts into shallow surface cuts, from which it is distributed on the land. The stoneware pipes are of course under some pressure when working, and there was at first some trouble from leaky joints, but these were not numerous and were easily stopped. One line of 15-inch and 12-inch stoneware pipes syphons across a depression in the land, for a length of 500 yards; the head on the lowest part, when in full work, being between five and six feet. In this case a collar of cement-concrete was placed round the joints exposed to the greatest pressure. There are two other syphons of stoneware pipes, with Stanford's joints, one having a dip of about 9 feet. Each line of iron and stoneware pipes is so placed and graded that it can completely empty itself on the surface of the land, so that no sludge can settle in the pipes when not in use. From the pumping returns of the two years ending June 1, 1883, I find that the quantity of sewage and surface water delivered upon the farm has been 522,265,575 gallons per annum, or a daily average of 1,430,865 gallons. The area of surface actually receiving sewage is about 315 acres. Thus the yearly quantity per acre would be 1,657,986 gallons. The above is equivalent to a rainfall of 73·2 inches per annum. The natural rainfall during the same period has averaged 30 inches per annum, which is considerably in excess of the average over a number of years. In connection with the farm, an unusual expenditure of over 2,000*l.* had to be incurred to meet the requirements of the County Lunatic Asylum, which took its drinking water from the stream below the farm. Dams were put in, and a reservoir to hold 300,000 gallons was constructed at a point above all chance of sewage pollution. A 4-inch cast-iron main was laid from it to the reservoir within the asylum grounds, a distance of 1,570 yards. It was stipulated that 50,000 gallons per diem should be supplied, and the works are calculated to afford nearly 70,000 gallons per diem if required. The cost of the foregoing works has been approximately as under :—

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	£
Purchase of site of pumping station, compensations, engines, and buildings, embanking, &c.	19,125
Rising main..	7.350
Farm—	
Purchase of 369 acres of land, compensation, laying out for irrigation, water supply to the Asylum, repairs, alterations, and additions to Farm buildings, working and maintenance, up to the time of commencing a separate Farm account	53,395
Legal and other charges, cost of evidence, &c., at inquiries, cost of loans, and establishment expenses.	3,775
Total	£83,645

The annual cost of pumping the sewage is about 1,000*l.* The financial result of the sewage farming down to Michaelmas last was that the receipts had exceeded the expenditure by 545*l.* It will of course be understood that neither the cost of pumping, nor the interest and repayments on account of loans for purchase of land and works, are charged against the farm; but, on the other hand, one-twentieth of the loan of 4,000*l.* obtained for stocking the farm, together with interest at 4 per cent. on the amount remaining outstanding, has been paid off each year out of farm account. An outbreak of foot-and-mouth disease among the cattle in 1881 occasioned a loss of 300*l.* or 400*l.* It should also be mentioned that the land came into the hands of the Board in such an exceptionally foul condition that a considerable area could not be cropped until last year, and the expenditure in cleansing the land has necessarily been very great. I venture to think that but for these untoward circumstances, and the generally depressed state of agriculture, a better result might have been shown.

SANITARY INSTITUTE OF GREAT BRITAIN.

THE following Supplementary Report of the judges on the exhibits deferred for further practical trial, in connection with the Society's Exhibition at Newcastle-on-Tyne, has recently been published :—

Out of the thirty-seven exhibits deferred for further practical trial, as mentioned in the Report, the following were submitted by the exhibitors :—Sanitary Paint Company, Liveroool, Sanitary Paints; Rimington Brothers, Newcastle-upon-Tyne, Bostel's 'Excelsior' Closet; Maguire & Son, Dublin, Flushing Tanks; Doulton & Co., London, Syphon Flushing Tank; Doulton & Co., London, Anti-percussion Ball-valve; Doulton & Co., London, Waste-preventing Closet-valve; Roberts, Charles G., Haslemere, Buck's Automatic Rain Water Separator; Desty, Henry, & Co., London, Gas Burner for Economising Consumption of Gas; Kite, C., & Co., London, Outlet Ventilator; *Norton Ventilator Company, London, Ventilating Apparatus; *Thomasson & Key, Worcester, Inlet Ventilator; Edmunds, J., London, Currie Powders; Irvine & Co., Gateshead, Mustard; Maignen, P. A., London, Improved Filtre Rapide; Brady & Martin, Newcastle-upon-Tyne, Pitt's Mineral Waters; British and Foreign Mineral Waters Company, Glasgow, Mineral Waters; Antiseptic Apparatus Manufacturing Company, London, Red Cross Antiseptic Fluid; Sanitas Company, Limited, London, Sanitas Disinfectant.

We recommend that the Medals should be awarded to the undermentioned exhibitors :—Doulton & Co., Lambeth, for Anti-percussion Ball-valve; Roberts, Charles G., Haslemere, for Buck's Automatic Rain Water Separator; Sanitas Company, Limited, London, for Sanitas Oil.

We also recommend that Certificates of Merit should be awarded to the undermentioned exhibitors :—Antiseptic Apparatus Manufacturing Company, London, for Red Cross Yellow Fluid Disinfectant; British and Foreign Mineral Water Company, Glasgow, for Potash, Soda, and Seltzer Waters, and Lemonade; Edmunds, J., London, for 'The Empress' Currie Powders; Irvine & Co., Gateshead-on-Tyne, for genuine Mustard; Kite & Co., London, for Chimney Brest Outlet Ventilator; Maignen, P. A. London, for Improved Filtre Rapide.

We have not yet had sufficient opportunity of testing those exhibits marked with an asterisk, and they are therefore of necessity deferred for a future Report.

W. H. CORFIELD, Chairman.
H. C. BARTLETT.
ROGERS FIELD.
HENRY LAW.
J. WALLACE PEGGS.
ERNEST TURNER.

THE COMPULSORY NOTIFICATION OF INFECTIOUS DISEASES.

AT the ordinary meeting of the Sanitary Institute of Great Britain held July 24, Dr. Carpenter in the chair, a paper was read by Professor W. H. Corfield, M.A., M.D., on 'The Compulsory Notification of Infectious Diseases.' The author said that the facts which he proposed to lay before them had been chiefly obtained from replies to a set of questions which he had sent to the medical officers of health, of the various towns where regulations for the compulsory notification of infectious disease were in force. After giving statistics and opinions of the medical officer of health as to the satisfactory working of the regulations in the eighteen towns from which he had received returns, Dr. Corfield said :—

From the facts that I have laid before you, I have been forced to the conclusion that the compulsory notification of 'Infectious Diseases' is a very important sanitary measure, and a great boon to the community to whom it has been applied. There can be no doubt whatever that, in a vast number of cases, information has been obtained of the existence of infectious disease which would never have been obtained at all, or, if obtained, would have come too late to be of much service. Every one who has had anything to do with the prevention of epidemic diseases knows that the most important thing of all is to get the earliest information of the cases that arise; and that an epidemic may be checked and stamped out with comparative ease if it is taken in hand early enough, but that the difficulty increases every day that is lost.

The objection that cases of concealment are likely or even certain to occur where such Acts are in force, has been completely met by the quotations that I have made to you; but to my mind, this objection of which so much has been made, is so childish as to be almost ludicrous. If there are cases of concealment every day where such an Act is in force, there are many times as many such cases where no Act is in force. One would have thought that it must have been obvious to every one, that in the towns where a hundred cases are reported under the Act, only ten were reported, during the same time, before the Act was passed; at any rate, there were ninety cases reported under the Act which would have been concealed without it.

With regard to the vexed question as to whether the medical attendant or the householder, or both, should be compelled to notify the existence of cases of these diseases to the sanitary authority, the most general practice appears to be to make it compulsory upon both; but the evidence, as I understand it, shows that at any rate medical men should be required to give the information; and also that they should be required to give it *direct to the sanitary authority*, rather than to the householder. This is a matter upon which I do not wish to insist strongly, but simply to give the impression that the results of the inquiries have left upon my mind. I think that the evidence is very strong that in most places, at any rate, little or no difficulty has arisen from the medical men being compelled to give this information. As to the suggestion that these Acts, so far from diminishing the number of cases of infectious diseases, are likely to increase them, I would ask you, do you think it likely that, without any exception, the medical officers of health of the towns where these Acts are in force would support them strongly if *they*

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thought the number of cases of infectious diseases was going to be increased by them?

The business of the medical officer of health is to *prevent* disease—especially such diseases as these—and he gains credit by doing this, and *not* by *increasing* them. Do you suppose that these medical officers of health do not know their own business, or do you suppose that they have combined together to do that which must certainly bring discredit upon themselves? I ask you on the contrary to believe that the medical officers of health of these towns know the way to prevent infectious diseases from spreading, and are doing their utmost to lead the medical profession and the public generally, up to the point of seeing the great need for the passing of such an Act as those which have been so beneficial where they have been applied for the whole kingdom. Aud I take this opportunity of thanking all those gentlemen for the trouble they have taken in answering the questions sent to them, and so enabling us to epitomise the evidence on the subject.

The following gentlemen took part in the discussion :—Dr. A. Carpenter, Mr. Ernest Turner, Dr. Dudfield, Dr. Walford, Mr. P. Lightfoot.

NORTH-EASTERN SANITARY INSPECTION ASSOCIATION.

On June 15 an inaugural meeting of the above society was held in the Lecture Room of the Literary and Philosophical Institute, Newcastle, under the presidency of Mr. A. Stevenson, J.P. There was a good attendance of medical men, architects, and builders. Professor Fleeming Jenkin, of Edinburgh, gave a brief lecture on healthy houses, wherein he graphically described the most common defects of unsanitary dwellings, the mode of their detection adopted by the society, and the plans proposed for their remedy. It was to be understood that the society's engineer simply made an inspection of premises, and gave his advice as to the best way of removing existing evils. The necessary work would have to be executed at the cost of the landlord or householder, and by whomsoever he might appoint.

Mr. Councillor Barkas said that they had already in Newcastle an excellent staff of sanitary officers, whose duties were analogous to those of the engineer of this society, and whose services were always available free of cost to the ratepayers. Under these circumstances he did not see the need of establishing a new sanitary association, which might lead to some unpleasant clashing with the regular appointed officers of the Corporation.

Professor Jenkin pointed out that in Newcastle alone there were 25,000 houses and seven sanitary officers. It must be obvious that it was impossible for each officer to devote as much personal attention to the three or four thousand houses in his district as was necessary; hence there was ample room for the operations of this association, which should be regarded as an aid to and not antagonistic to the Corporation officers, this being the light in which similar associations were looked on in other large towns where they were established and received the co-operation of the town officials. Professor Jenkin also remarked that the proposed work of the society embraced a wide area of the north-east coast, including many towns and villages which could not boast of the advantages which Newcastle possessed. The resolution to form the society was carried unanimously.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

At a general meeting of sanitary inspectors, held at the Holborn Town Hall, on July 28, considerable progress was made towards placing this proposed association on a permanent basis. In addition to the appointment of a chairman, treasurer, and secretary, an executive council was elected, and at the next meeting, to be held in October, arrangements will be made for the presentation and discussion of papers of sanitary interest. The chair was taken by Mr. G. B. Jerram (surveyor and inspector, Walthamstow), and some routine business having been transacted,

The Chairman proceeded to explain the principal objects of the association. He referred to the resolution passed at the previous meeting, which directed the provisional committee to consider the expediency of admitting a grade of members, not necessarily public sanitary inspectors, to be termed associates. Not only these, but all persons interested in sanitary work, the association would be ready to receive. He maintained that the society should be one of practical sanitary workers, whose everyday life is spent in combating disease, and generally in maintaining and improving the health of the people. How continuous sanitary progress could best be effected was, he admitted, a matter of much contention, but if the public could in any way be incited to take a greater interest in the sanitary welfare of their homes, one of the objects of the association would be attained. The society would also, he hoped, be able to ensure greater efficiency in carrying out the provisions of the various Sanitary and Public Health Acts. In concluding, Mr. Jerram dwelt upon the direct and indirect advantages held out to public inspectors, and he asked them not only for their support, but for their experience, so that the meetings of the association might be made of the utmost practical use.

The secretary (Mr. S. C. Legg), after reading a report of the work of the provisional committee, detailed the steps that had been taken to make known to inspectors the objects of the association. Up to that date forty-three officers had become members. The report of the committee was adopted. The meeting then discussed the code of rules submitted which, after some minor alterations, was accepted.

The executive officers for the ensuing year were then elected. Mr. Jerram was appointed chairman, Messrs. Buckworth (St. Saviour's), Rains (St. George's-in-the-East), Rees (Birmingham), vice-chairmen; Mr. A. H. Lukes (Gravesend), treasurer; and Mr. S. C. Legg (Hackney), secretary. The following inspectors were appointed to form the council :—Messrs. Boulter (Bexley), Bond (St. Giles), Lewis (Port of London), Matthews (Croydon), Sherbourne (Chelsea), Poulson (Tottenham), Harris (Wolverhampton), Fisher (Camberwell), Brooks (Westminster), Chamberlain (Fulham), Raymond (Poplar), and Stace (Limehouse). In acknowledging his election, Mr. Harris, a member of the Midland Association of Sanitary Officers, referred to other societies which had failed to accomplish their object owing to insufficient support. He strongly urged upon those present the importance of punctually attending each meeting, and for himself, although residing a considerable distance from London, he would do his best to assist the objects of the new association.

Letters expressing interest in the society were read from Sir Charles Dilke, President of the Local Government Board, Dr. Richardson, the Society of Medical Officers of Health, the Sanitary Institute, Mr. E. C. Robins, F.S.A. (with a donation of 5*l.*), Dr. A. Carpenter, Mr. W. T. M. Torrens, M.P., and Mr. Rogers Field, B.A. Votes of thanks were unanimously accorded for this support, to the press, and to the chairman, Mr. Jerram.

The next meeting of the association will be held on October 6, of which all members will receive due notice. Inspectors desirous of joining should communicate with Mr. S. C. Legg, 62 Gayhurst Road, Dalston, E.

A LADY has been appointed chief clerk of the statistics at Ottawa, Canada. She is the first woman who has been promoted to so important a place in the Dominion.

THE Convocation of Oxford University have, it is stated, decided to contribute 1,000*l.* a year in aid of a scheme for the drainage of the Thames Valley.

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REPORTS OF MEDICAL OFFICERS OF HEALTH.

ASTON MANOR.—In his excellent report on this district for 1882, Mr. May gives a noteworthy instance of the value of house-to-house visitations. The pressure of other work prevented the inspection being made in the lines adopted in previous years, but the numerous notifications of cases of infectious disease afforded an opportunity of inquiring into the sanitary circumstances of the infected premises, an investigation which was extended to other houses in the same court or building. In this way 368 reports were made on 1,532 houses situated in all parts of the district. Very many sanitary defects, errors in house construction, and nuisances injurious to health were brought to light by this visitation. Many cases occurred in back-to-back houses, having neither back-door nor window for through ventilation, some being so dilapidated and neglected as to be almost unfit for habitation. Other houses were without a damp-proof course, and the moisture from the soil saturated the bricks nearly to the bedroom. Of the 1,532 houses, 296 had defective drains and 114 were directly connected with the sewers. Having regard to the defective conditions discovered by this visitation, it is not surprising that the Central Board so rigidly insist upon systematic inspection being one of the chief duties of a health officer. Much good work has been accomplished of late in reconstructing the old-fashioned midden privies. In the year 1875 over two thousand of these filthy receptacles had a larger internal area than twenty square feet, and a storage capacity of three to ten cartloads. Of thirty-eight samples of water examined fourteen were obviously polluted with sewage, and considerable improvement has resulted from the substitution of tap water. The adoption of by-laws, which are based on the models issued by the Local Government Board, cannot fail to prove beneficial to the health of the inhabitants, those relating to new buildings being of special importance. The chief events of the year calling for notice were the epidemic prevalence of measles, and an increase of typhoid fever. Small-pox threatened to invade the district, and ten cases actually occurred, but decisive measures were taken for preventing the spread of the infection, and only one death was registered from this cause. Of measles there were 375 cases, chiefly among children of the school-going age, and 17 deaths. There is little doubt that the congregation of these children at school played an important part in the epidemic, but there were other sources of intercommunication, and none of the schools seem to have been closed. The prevalence of typhoid fever is chiefly noticeable for its association with cases of diarrhœa, a relationship which has previously been noticed. Altogether there were some 50 cases of fever reported from 40 houses, and there were 13 deaths from this cause. The gradual but persistent decline in the death-rate of the district (from 18·5 in 1872 to 15·4 per 1,000 in 1882) speaks well for the energetic supervision exercised by Mr. May, and for the foresight of the local authority in adopting the measures needful for the sanitary safe-guarding of a so rapidly increasing place as Aston Manor.

BACUP.—The local authority of this place appear to have a proper regard to the recommendations of their health officer, who is to be congratulated on the amount of improvement which he secures. During the past year the health committee have had under their serious consideration the disposal of ashes and excreta, and have been considerably perplexed which system to adopt, as places for tipping are difficult to obtain. The Rochdale system was inspected, but was not approved, and an examination was made of the destructor in use at Leeds. There seems some difficulty in Bacup in obtaining a suitable site for the erection of one of these important sanitary appliances. The efforts of the authority to obtain a regular and systematic removal of the refuse in their district have thus far been unsuccessful, but the matter is still receiving their attention. In other respects the sanitary condition of the district calls for little comment. Some extension was made in the system of main sewers, and schemes for sewering other portions of the borough are contemplated. From all causes there were 533 deaths registered, representing a death-rate of 20·90 per 1,000. Zymotic diseases destroyed 37 lives. Scarlatina of a mild form was more or less prevalent throughout the district, the spread of the infection being caused, as usual, by the persistent visiting of neighbours. There was a considerable number of cases of enteric fever, with seven deaths, and in almost all the houses where the disease occurred defective sanitary conditions existed, the most common being untrapped slop-stone drains, which in some cases communicated directly with the sewer. There were a few deaths from diarrhœa, and Dr. Brown gives an interesting account of an epidemic of this disorder which was traced to pollution of the water supply by sewage filtration.

BARNSLEY RURAL.—The unfavourable state of the weather during 1882 from an agricultural point of view, coupled with a continued unsatisfactory condition of the coal trade, exercised a more or less depressing influence throughout the whole of this district, and seems to have checked the influx of population which a few years ago was so obvious. A noteworthy indication of this is afforded by the diminution in the number of places submitted for new dwelling-houses, which were 33 only during the past year, against 280 in 1877. Probably this depressed state of trade accounts for the partial inactivity of the sanitary authority, for though an important township was sewered, the condition of the water supply in many parts of the district is such as to call for prompt and active measures. Smoke nuisances of a serious character abound, and Dr. Sadler fears that nothing less than fresh legislation can adequately deal with them, but he does not state whether any precautions have been taken by colliery owners with a view of abating the nuisance. A large proportion of the total deaths registered during the year (405) occurred in children, 215, or nearly 55 per cent., being under five years of age, while 141 had not completed twelve months. An important item in this mortality was the fatal prevalence of diarrhœa and dysentery, which destroyed 36 lives, while scarlatina and whooping-cough each accounted for 11. Altogether, zymotic diseases, including six cases of croup, were fatal to 79 persons, representing the high rate of 3·83 per 1,000. Dr. Sadler notes with satisfaction the assistance afforded by the school-attendance officer, who is assistant inspector of nuisances, in giving early information of cases of illness among school children.

CARMARTHEN URBAN.—The result of the sanitary work which has been gradually but persistently carried out in this district during the past ten years, must be gratifying to the authority. In 1873 there were 454 houses in the town division entirely without any privy accommodation, while at the present time there is not one without some suitable provision of the kind. There were then 679 water-closets in the town, and this number has now increased to 1,542. A still greater improvement has been the abolition of 594 detestable cesspools which formerly saturated and polluted the subsoil with sewage. In securing the performance of this work Mr. Hughes has shown what can be done by sustained action, but at least some of the credit is due to the authority who have carried out his recommendations in the face of considerable opposition. The death-rate for 1882 (17·69 per 1,000) compares favourably with the rate for the previous ten years and appears to be steadily decreasing. Zymotic diseases proved fatal to twelve persons, all of which were inhabitants of the town division. These deaths included six from whooping-cough, three from scarlatina, and three from typhoid fever. Eight non-fatal cases of diphtheria came to notice during the year, seven of which happened in one family. The cause of this outbreak was attributed

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to the stoppage of a drain. The remaining case was caused by the escape of sewer air. A noticeable feature of the vital statistics of the past year is the decrease in the mortality from scrofula, the deaths from this disease being thirty against an average for the past nine years of forty-five. Mr. Hughes thinks that the wet weather may have some influence in the causation of this mortality, and he urges his authority to enforce the provision of means for keeping the houses free from damp.

HANDSWORTH (NEAR BIRMINGHAM).—The importance of a district being provided with public baths cannot be over estimated; and Dr. Welch has done well in urging his authority to no longer delay the consideration of their provision. In Handsworth there is a large and increasing population engaged in engineering workshops, collieries, and other work of a more or less arduous and dirty nature, and it is essential that this population should be provided with every means which will conduce to the greater cleanliness of their persons, and thus to their health. In other matters connected with the well-being of the district, Dr. Welch's advice is practical and to the point. He properly draws attention to the importance of house connections with the main sewers being made with great care, and dwells upon the necessity of frequent flushing. Judged by the death-rate, which during the last two years was 12·8, and 12·9 per 1,000 respectively, the state of the public health in Handsworth is very satisfactory, a fact which is further borne out by the diminished rate of infantile mortality. The most troublesome epidemic of the year was one of whooping-cough, which destroyed eleven infant lives. Measles was also epidemic, but although 60 cases of scarlatina were reported, the disease did not assume dangerous proportions. Small-pox was introduced into the district, but prompt measures of isolation, disinfection, and re-vaccination, prevented the extension of the infection, and no death from this cause happened in the district.

HOVE.—Dr. Kebbell's report is chiefly occupied in dealing with the mortality statistics recorded during 1882, which are very favourable to the reputation of the town as a health resort. From all causes there were 299 deaths, representing a death-rate of 13·6 per 1,000 against that of 14·7 recorded in the previous year. The mortality from the principal zymotic causes was unduly increased by whooping-cough, which was present in an epidemic form during the first half of the year, and which proved fatal to thirty-three children. There were but two deaths from typhoid fever, a fact to which Dr. Kebbell draws special attention as affording satisfactory evidence of the sound condition of the drainage arrangements of the town. Amongst persons aged 60 and upwards there were eighty-one deaths, representing 27 per cent. of the whole mortality.

MONMOUTH RURAL.—Measles was generally prevalent in this district during 1882 and caused thirteen deaths out of a total of 340 from all causes. The spread of the disease was associated with school attendance, one of the initial cases happening in the family of a schoolmaster. No attempt seems to have been made to close the schools, but precautions were taken in some instances to prevent the attendance of children from infected families. Scarlatina also appeared at different periods of the year, and in one parish the infection was disseminated by a washerwoman in whose family the disease had existed. The death-rate, which represented 15·50 per 1,000, is satisfactory, regard being had to the fact that one half of the population are engaged in mines and quarries. Dr. Willis gives a brief account of his sanitary work, which appears to have been systematically performed.

OKEHAMPTON RURAL.—The sanitary authority of this district seem loth to commence the many works of improvement which are evidently required. Notwithstanding the constant and repeated recommendations of their health officer, but little real progress has been so far made. Some slight improvement has been made in the system of manure removal, but the important question of water supply calls for immediate attention. In one village, consisting of 75 houses, 12 only have an independent supply, and this condition of things appears to be common in many portions of the district. Mr. Ash again suggests that his authority should make greater use of the provisions of the Public Health (Water) Act of 1878. Many schools were examined with regard to excrement removal, but in none were the sanitary arrangements as satisfactory as those in which the dry earth and pail system is efficiently carried out. The statistics recorded during the year present few points of interest. The death-rate was equal to 14·73 per 1,000, and there were but 10 deaths registered from zymotic diseases, 7 of which were from diarrhœa. The fatality from heart disease points to the prevalence of rheumatic and gouty affections. The remarkable decline in the mortality from phthisis, which caused 11 deaths as against 30 in the previous year, seems accidental. An outbreak of typhoid fever at Sandy Bank demonstrated how easily the infection can be disseminated by specifically contaminated water, for of 12 persons who obtained their water from a polluted well, 8 contracted the disease, and 2 died.

REDDITCH.—The shortcomings of the sanitary authority of Redditch have more than once been referred to in these columns. During 1882 the town was visited with a destructive outbreak of typhoid fever, which attacked some thirty-five persons and caused eight deaths. This outbreak was to have been the subject of a special report, but this has never been brought to the light of publication. Including the cases of typhoid, no fewer than 391 persons were attacked with some kind of zymotic disease, of whom 33 died. Ten deaths were from scarlatina, due apparently to after-complications induced by neglect and insufficient protection from cold. The spread of the disease was, however, greatly assisted by the absence of any provision for isolating cases of infectious disorders—a provision so persistently urged by Mr. Page, the late health officer. A hospital for this purpose seems especially necessary, regard being had to the character of the houses, which in many parts of the district are such as to render isolation quite impossible. During the outbreak in 1882 numerous cases came to light where houses—having three rooms, with little or no ventilation—were occupied by a man, his wife, and several children. This was brought before the local authority at a recent meeting, when the health officer read his annual report; but beyond an expression of thanks to that official no action whatever was taken. The lesson taught by the destructive outbreak of typhoid fever at Bangor, which cost some 4,000*l*., in addition to ruining for some time the prosperity of the place, appears to have been lost upon this authority.

STRETFORD.—The death-rate of this township, which has an estimated population of 20,000 inhabitants, was 14·75 per 1,000 in 1882, against an average rate of 15·23 for the previous five years. Of the 39 deaths attributed to zymotic causes, as many as eight were caused by typhoid fever. In one house, where there had been a great deal of sickness for a considerable time, an examination of the premises revealed some very defective sanitary arrangements. In one of the cellars the water-closet drain leaked, while the soil-pipe acted as an overflow from the cistern, the water of which was used for drinking purposes. These were speedily altered for the better, and, acting upon Mr. Pettinger's advice, the ashpits and closets were detached from the scullery walls. In commenting on the increased prevalence of diarrhœa, which caused 12 deaths, the health officer again refers to the defective and ill-constructed ashpits and privies in a certain portion of the district, and urges his authority to immediately take action to secure their reconstruction. Mr. Pettinger notes the extension of the public water supply to several houses, and he chronicles the commencement of a main drainage scheme.

TORQUAY.—The past year witnessed the commencement and partial completion of some useful sanitary work in Torquay, where the local authority seemed deter-

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mined to spare no effort to place their district in a satisfactory condition. A sanatorium for the treatment of cases of infectious disease was rapidly approaching completion at the date of the report, and Mr. Karkeek has good reason for congratulating his authority upon its acquisition. Mr. Karkeek has also to chronicle the completion of a new main sewer, and of the progress of the scheme for supplying Torquay with a constant service of water. Systematic inspections were made of the whole town, while one portion was made the subject of a very minute examination. Generally speaking, the sanitary condition of the houses was satisfactory, and the few defects that came to light are to be speedily remedied. The death-rate from all causes represented 14·6 per 1,000, and the total number of deaths (363) is the lowest recorded since 1874. At no time during the year did zymotic disease assume epidemic proportions, and there were but few deaths recorded from these causes.

WALKER-ON-TYNE.—The sanitary authority of this township seem determined to do nothing in the way of improvement. In many respects the sanitary condition of the place is such as to call for immediate and sustained action. There is no system of scavenging, many of the streets are unpaved, sewers are required, and there is no hospital for treating cases of infectious disease. All these matters have been repeatedly brought under the notice of the authority, but no steps whatever have been taken towards their provision. The need which exists for hospital accommodation was abundantly demonstrated by the severe epidemic of scarlet fever which, among an estimated population of 10,000 persons, destroyed no less than sixty-two lives. The infantile death-rate, a reliable index of sanitary condition, was enormously high, as many as 115 children dying before they completed their fifth year, and fifty-six of these were from zymotic causes. The history of an outbreak of small-pox also demonstrates the grave responsibility which the authority are daily incurring. The first case of the disease happened in June, but this was carefully isolated at home and no further cases occurred in the neighbourhood in which the house was situated. Some weeks afterwards a case was imported by a boy attending school at Newcastle; this boy's father contracted the disease and died of it; a woman who visited the house also contracted the disease and she in her turn communicated it to her neighbours. Altogether thirty-seven cases occurred, some of which were of a very severe type. Owing, however, to the well-vaccinated state of the population, two deaths only were reported, one being that of an unvaccinated infant seven weeks old.

WINDSOR.—Dr. Casey's appointment as health officer to Windsor promises to be a distinct advantage to the district. His first report suffers of necessity from the fact that he did not commence work until the beginning of the present year, and it is from this cause that it is chiefly occupied with statistics. Judged by its death-rate, which in 1882 represented 16·3 per 1000, Windsor seems in a good sanitary condition, and so far Dr. Casey has few measures of improvement to suggest, beyond recommending that special care should be exercised with regard to the erection of new buildings. This suggestion has been made in view of the mortality of phthisis, which, although little above the average for all England, might, having regard to the circumstances of Windsor, be lowered. Many of the conditions which play an important part in the causation of this disease are beyond the control of sanitary authorities, but much may be done by them towards remedying a damp subsoil. A large part of the town of Windsor stands upon a retentive clay, while another portion is liable to periodical floods. Dr. Casey properly suggests that in the case of houses built on a wet clay, efficient subsoil drainage should be required, and that both in this case and in that of houses in the low-lying district, it should be provided that the whole of the basement should rest upon a bed of concrete. With the adoption of these precautions, and the insertion of proper damp-courses in the walls, the evil may be minimised even if it cannot be wholly prevented.

SANITARY INSPECTORS' REPORTS.

BEDFORD RURAL.—During 1882 Mr. Adams had to deal with some 296 nuisances, of which 158 arose from foul accumulations, twenty-five from defective drains, twenty-two from dilapidated houses, and nineteen from an insufficient supply of water. Of these 194 were abated without formal notice, ninety-one after the issue of the notice, one after proceedings, and ten were in course of abatement at the date of the report. The prevalence of infectious disease in the district occasioned some additional work, and as many as forty houses were disinfected.

BOURNEMOUTH.—Mr. O'Connell presents a very satisfactory account of his work in this popular health resort during the past year. Nuisance removal appears to have received prompt attention, and in one portion of the district improvements of a permanent character have been effected by the connection of houses with the main sewers and the supply of public water. Altogether 361 nuisances were dealt with, of which thirty-seven arose from defective house drains, and forty-two from foul closets, piggeries, and backyards. The question of the disposal of refuse is one which the authority should seriously consider. At present the rubbish is placed outside the district, where, by its offensive putrefaction, considerable nuisance is caused.

COVENTRY.—The report of Mr. Booker, the sanitary inspector of Coventry, is one of the best that has come before us. Mr. Booker has already given in these columns his ideas as to what an inspector's report should contain, and the statement of his work for the past year shows that hs is capable of practically carrying out his views. The first part is occupied with a statement of the several improvements effected and of the nuisances abated during the year. Mr. Booker reports that sixty-four sink drains were disconnected from the interior of houses, that ninety-eight privies were converted into water-closets, that forty-three defective drains were repaired, opened, and cleared from obstruction, and that sixty-three water-closets were provided with an efficient water supply and flushing apparatus. Overcrowding was abated in four cases, sixty-six filthy and unwholesome houses were whitewashed and cleansed, and a number of other sanitary operations were performed. In the concluding portion of the report the inspector gives an account of his work under the Sale of Food aud Drugs Act, the Dairies and Milk Shops Order, and of his inspection of the common lodging-houses, slaughter-houses, and canal-boats.

HALIFAX URBAN.—The sanitary supervision of this borough, which contains a population of over 74,000 persons, can be no light task, but Mr. Travis appears to have discharged his difficult duties with zeal and ability. During 1882 as many as 5,020 houses were visited on account of defective drainage, trapping, disinfection, &c., against 2,082 in the previous year. The table of nuisances dealt with contains a record of the performance of so much useful work in the disconnection of sink drains, the repairing of defective drains, the abatement of overcrowding, and the reconstruction of ashpits and privies. The inspector gives a detailed account of the scavenging of Goux closets, of which 516 were fixed during the year, making a total of 6,015, and of the collection of samples under the Food and Drugs Act. A careful supervision was exercised in regard to smoke nuisances, and of seven cases in which it was necessary to resort to legal proceedings four were for allowing the escape of dense smoke. Mr. Travis concludes an excellent report by an appeal

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his authority for the provision of some disinfecting ovens which seem urgently required.

HARBORNE URBAN.—The local authority of the district have issued in a separate form the reports of their surveyor and of their inspector of nuisances upon the sanitary work accomplished during 1882. Mr. Newey, the surveyor, states that several ventilating shafts and grates were fixed; that a number of roads and footpaths were widened, remade, and otherwise improved; and that 1,083 yards of kerbing and channelling were laid. Under the supervision of the sanitary inspector, Mr. Worrall, some useful work was performed. During 1882 the number of nuisances dealt with was 311, as against 333 in the preceding year. As many as 145 of these arose from defective drainage and improper sink drains, and the heavy rains of last year increased the number of wet cellars.

HEBBURN.—Mr. Waugh's report consists of a list of notices issued during 1882 for the abatement of nuisances, and it does not show how many orders were complied with. Altogether some 800 notices were served, of which 107 were to remedy defective drains, dilapidated privies, ashpits, water-closets, &c., 14 to remove offensive accumulations, 15 to limewash dwelling-houses, while 2 had reference to nuisances which are dealt with by bye-laws. In consequence of the prevalence of infectious disease as many as 206 houses were visited, of which 120 were disinfected. Legal proceedings were resorted to on one occasion, the offender being a butcher who was fined for exposing diseased meat.

LEEK.—Mr. Farrow gives a fairly complete account of his work in the district during 1882, but he has omitted to include a statement of the character of the nuisances, to abate which it was necessary to issue 241 notices. No structural improvements appear to have been effected during the year, but the inspector states that the common lodging-houses and slaughter-houses received attention, as well as the removal of refuse. During the year 54 cases of infectious disease were reported, and 13 houses and 475 articles of clothing were disinfected. The report contains an abstract of the census returns, a statement of the number of interments within the town, and other tables of interest, including one setting out the number of convictions for felony and drunkenness.

LYTHAM.—In addition to the abatement of nuisances, Mr. Whiteside reports that a considerable number of works of importance were carried out during 1882. Thus as many as 86 drains were opened up and cleansed, 685 living and sleeping rooms were whitewashed, 29 houses were supplied with traps and waterspouts, and 17 slopstone pipes were severed from the drain. The removal of refuse appears to have been expeditiously performed; 1,490 loads of manure and 892 loads of rubbish were removed, and 63 piggeries and yards were cleansed. No fewer than 292 ashpits, urinals, and water-closets were disinfected, and 911 manholes and street cesspools were opened up and cleansed. In only 34 cases was it necessary for Mr. Whiteside to issue notices for the removal of nuisances.

MERIDEN RURAL.—The collection of samples under the Food and Drugs Act appears to have received special attention at the hands of Mr. Bretherton, and it is satisfactory to note that the activity of the inspector led to three convictions. Legal proceedings were also resorted to against a woman for exposing herself whilst suffering from small-pox, and another person was summoned for removing clothing from an infected house, convictions being obtained in both cases. Current sanitary work appears to have been satisfactorily performed, the inspector reporting that, in addition to the cleansing of ditches and the removal of other nuisances incidental to a rural district, a considerable number of drains were laid, trapped, and repaired.

NEWTON ABBOT RURAL.—Sanitary work appears to have been rapidly carried on in this district during the past year, though Mr. Seager's report upon it is statistical only. Sixteen house drains were connected with the public sewers, 27 water waste preventers were fixed, four new sewers were constructed, six new ventilating shafts were fixed, and a number of old drains were unchoked and repaired. Overcrowding was abated in two cases, and 146 privies, cesspits, and manure pits were properly cleansed. A regular inspection was made of the slaughter-houses, 15 of which were whitewashed. The total number of nuisances dealt with during the year amounted to 146.

RUGBY.—A special word of praise is due to Mr. Redfern, the surveyor and inspector of this extensive district, for the excellent manner in which he has prepared his report for the past year. Under the head of nuisance removal the inspector gives a tabulated statement as to the conditions injurious to health in the various parishes in the district, indicating the number of notices issued, and the number complied with. Thirty-five samples of water were submitted for analysis, 14 of which were condemned as unfit for domestic use. A new 12-inch main sewer was laid during the year, and the existing sewers appear to have been periodically examined and kept in order. Although nearly 300 nuisances were dealt with by Mr. Redfern, in two cases only was it necessary to resort to legal proceedings, one of the offenders being a notorious retailer of diseased meat, who was mulcted in the substantial penalty of 40*l*.

SOLIHULL RURAL.—Mr. Harris has prepared an excellent report on his work in this district during the past year. It contains, in addition to the statistics of nuisance removal, a clear account of the sanitary progress made, and a brief reference to the measures taken for the removal of cases of infectious disease. The inspector served 422 notices upon owners and occupiers of premises for the abatement of various nuisances, a large proportion of which received prompt attention, since at the date of the report 59 only remained to be disposed of. The water supply in some parts of the district is in great need of improvement, as many as 65 polluted wells coming under notice during the year, though only 25 notices were issued under the Public Health (Water) Act. The inspector notes that the work of connecting premises with the main sewers has been steadily carried on, and that there are now but a few properties to connect.

TRING URBAN.—The routine work of this small urban district, which has a population of 4,384 persons only, appears to have been satisfactorily performed. Mr. Baines reports that during 1882, 18 cottages were built or repaired and that 43 drains were connected with the sewers. The report also gives some details of the removal of refuse, and states that 29 plans of houses and cottages were approved by the authority.

WARWICK, SOUTHAM, AND KENILWORTH.—The reports of Mr. Trepess on these districts are excellently arranged. In addition to the usual statistical table of nuisance abatement, there is a brief review of the work performed during the year. In the Warwick district 355 nuisances were removed, including the trapping and repairing of 56 drains, the conversion of ten privies into pail closets, and the cleansing of 120 cesspools, ashpits, &c. Nine certificates were issued to 18 houses, in accordance with the provisions of the Public Health (Water) Act, 1878; and 19 samples of water were collected for analysis. In the Southam district 443 nuisances were disposed of, and some improvements were made in the water supply and drainage. At Lillington 31 privies were converted into water-closets, 43 drains were repaired and trapped, and 8 new wells were sunk. Details are given of the performance of other routine work, and of the inspector's action in removing cases of infectious disease.

WATFORD RURAL.—This, like other reports on adjoining districts, is in a tabular form. From Mr. Heath's statement it appears that sanitary work has not been neg-

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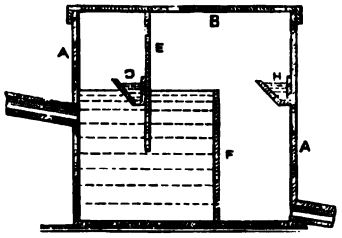
lected, although improvements of a minor character have been effected. During 1882 9 drains were disconnected from the interior of houses, 27 privies were converted into earth-closets, 13 drains were ventilated, and 23 were trapped, and water was provided in 83 instances. Twenty-three privies were erected, 11 were repaired, and 54 were emptied; 100 houses were disinfected after the prevalence of infectious disease, and a number of others were cleansed and whitewashed. The total number of nuisances for which notices were issued was 424.

ILLUSTRATED SANITARY PATENTS.

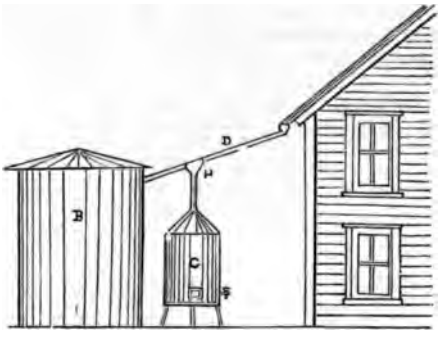
AMERICAN.

268,584. SEWER-GAS TRAP: MOSES T. WILLIAMS, Riverside, Conn. Filed Sept. 7, 1882.



Claim.—In a sewer-gas trap, the combination, with the trap A, provided with a separable cover, B, and divided into three compartments by the upper and lower partitions, E F, of disinfectant vessels G H, substantially as herein shown and described, whereby sewer-gas passing through or generated in the trap will be prevented from entering the building.

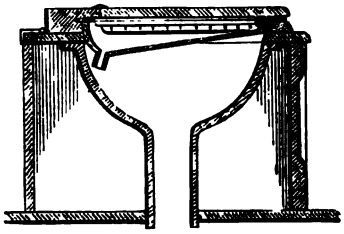
268,914. RAIN-WATER CUT-OFF: GEORGE LEMLE, New Orleans, La. Filed March 21, 1882.



Claim.—1. In a rain-water cut-off, the slanting conducting-pipe D, the cistern B, and the intermediate cut-off tank, C, so arranged under the pipe D that said tank C must be filled with water by said pipe D before the pipe can carry water into the cistern. 2. In a rain-water cut-off, the cistern B, the cut-off tank C, and the slanting conducting-pipe D, provided with an enlargement or offset H.

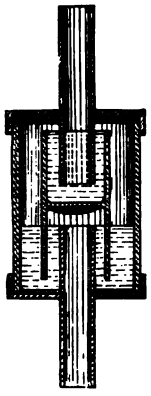
269,648. DEVICE FOR WASHING A COMBINED URINAL AND PRIVY-COVER: SIGMUND EDINGER, New York, N.Y. Filed Sept. 22, 1882.

Claim.—1. The combination, with a combined urinal and privy-cover, consisting of a pan and an auxiliary cover, of devices to introduce water thereinto for the purpose of washing the same. 2. The combination, with a combined urinal and privy-cover consisting of a pan and an auxiliary cover, of devices to spray water into said pan and into the inner face of its cover. 3. The combination, with a combined urinal and privy-cover, the same being attached to the seat of a closet, of a water-pipe and a pipe



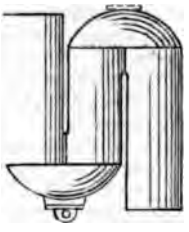
movably connected with the pipe aforesaid, and extending into the urinal and privy-cover, the portions of the pipe located therein being perforated.

268,865. SEWER-GAS TRAP: HENRY R. CASSEL, New York, N.Y. Filed April 29, 1882.



Claim.—A sewer-gas trap consisting of an exterior chamber, into which the induction and eduction pipes terminate, and of an interior cylinder of less height than the exterior chamber, said cylinder having a transverse diaphragm intermediately between the ends of the induction and eduction pipes.

269,177. LEAD TRAP OR CESSPOOL: ALEXANDER CHAPMAN, Montreal, Quebec, Canada. Filed Aug. 9, 1882.



Claim.—A lead trap made up of separate inlet, intermediate, and discharge pipes, and separate caps covering the bends, their meeting edges being joined together edge to edge without overlapping, and joined lead to lead, without solder.

270,034. MERCURY SEAL-JOINT TRAP FOR BATH TUBS, &C.: ABRAHAM EDWARDS, Asbury Park, N. J., and SAMUEL J. VAN STAVOREN, Philadelphia, Pa., assignors to said Edwards. Filed May 22, 1882.

Claim.—1. A stench-trap composed of a body having lateral cleaning out opening and an eduction pipe, a top or cover for said body, having an induction pipe, and an inverted cup suspended within said body between the induction and eduction pipes, and provided with external

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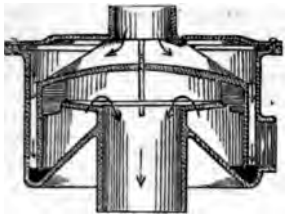
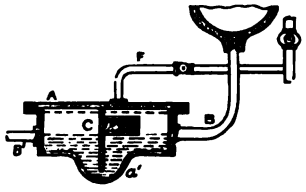
vertical ribs or scrapers, substantially as shown and described.



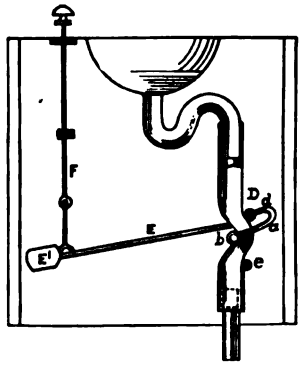
A stench-trap composed of a top, with induction pipe, a body having eduction pipe, and a trough or groove with a mercury seal, and an inverted cup between said pipes, the lower edge of the cup dipping into said sealing medium, and said cup being of such size or diameter that the horizontal area or width of the space between the cup and the body of the trap is less than the width or extent of the mercury or sealing medium in said groove or trough.

270,111. TRAP FOR WASH STANDS, &c.: CHARLES F. PIKE, Philadelphia, Pa., assignor to the National Anti-Sewer Gas Co., Camden, N. J. Filed July 31, 1882.



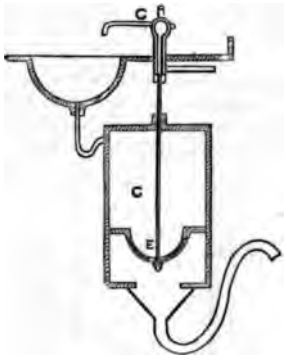
Claim.—1. A stench-trap for wash-basins, &c., provided with a pipe connected to the water supply pipe of such fixtures, whereby a continuous flow of water is conducted into said trap, in combination with means for regulating the volume of such flow, substantially as set forth. 2. A stench-trap for wash-basins, &c., provided with a disinfectant-containing pocket, and a pipe leading thereto and connected with the water supply pipe of such fixtures, whereby a continuous flow of water is passed to said pocket to provide a running disinfectant seal for said trap, substantially as set forth. 3. The trap A, having induction pipe B, eduction pipe B^1, partition C, and curved bottom a^1, in combination with a water supply pipe F, substantially as shown and described. 4. The trap A, having induction pipe B, eduction pipe B^1, partition C, curved bottom a^1, and pocket D, in combination with a water supply pipe F, substantially as shown and described.

270,211. WATER-CLOSET SHUT-OFF: JOHN FARTHING, Chicago, Ill. Filed August 31, 1882.



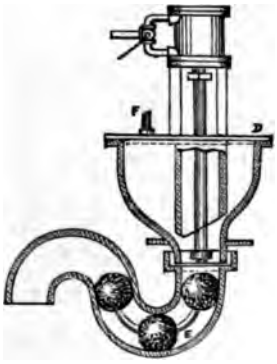
Claim.—1. The combination, with a bowl or receptacle and its discharge pipe or tube, of an interposed flexible connection D, lever or arm E, having fork *a*, with a return carrying a compression bar *b*, and bars or rods *d e* for compressing the tube. 2. The combination, with a bowl or receptacle and its discharge pipes or tubes, of a flexible tube D, weighted arm or lever E E', fork *a*, bar *b*, and bars or rods *d e*. 3. The combination, with a bowl or receptacle and its discharge pipe or tube, of the flexible tube D, arm or lever E, fork *a*, bars or rods *b d e*, and lift F.

270,876. SEWER OR STENCH TRAP: LEE D. CRAIG, San Francisco, Cal. Filed November 28, 1882.



Claim.—1. In a stench or sewer trap, the receiver C, connected with the sink or bowl by a pipe above, and with a waste-pipe by an exit-opening below, in combination with the valve E, connected with the faucet G, so as to be opened or closed simultaneously therewith, substantially as herein described. 2. In combination with a basin and movable faucet, an upper reservoir and valve, and a lower receiver and valve, both valves being fixed on the same stem and operated by the faucet, and arranged to open and close alternately, substantially as described. 3. The valve E, placed within the box or receiver C, and connected by a rod or stem with the supply-faucet, whereby a simultaneous action of the two may take place, substantially as herein described.

271,358. CLEANSING WATER-CLOSET AND OTHER TRAPS: CHARLES F. PIKE, Philadelphia, Pa., assignor to the National Anti-Sewer Gas Company, Camden, N.J.



Claim.—1. In cleansing water-closet traps, the method of removing their fæcal incrustrations without displacing the closet bowl, which consists in passing a flexible tool through the bowl and inserting it into the trap, then applying water thereto to rapidly and continuously move the tool in impingement with such incrustations until their removal is effected, a stream or flow of water being admitted to said trap during such operation, substantially as set forth. 2. In a device for cleansing the traps of water-closets and other traps, the combination of plate D, brush E, adapted to conform to the outline of the trap and

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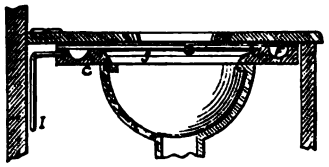
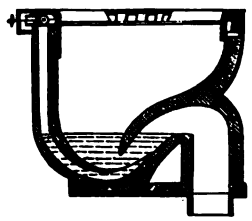
rotate or reciprocate therein, mechanism for effecting such movement, and a water supply pipe F, substantially as shown and described.

271,557. SPLASH-BOARD FOR WATER-CLOSETS: WILLIAM WELCH, JOHN COUGHLIN, and JOHN J. MAHONEY, San Francisco, Cal. Filed Sept. 20, 1882.



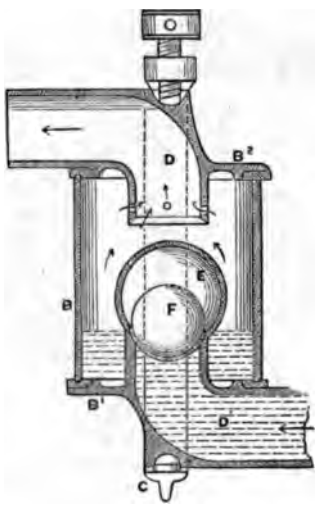
Claim.—The combination of the water-closet splash-board C, having trough F and inner bevelled surface J, the covering strip G, and the water supply pipe I, substantially as shown and described.

271,752. WATER-CLOSET: DARIUS WELLINGTON, Boston, Mass. Filed Oct. 27, 1882.



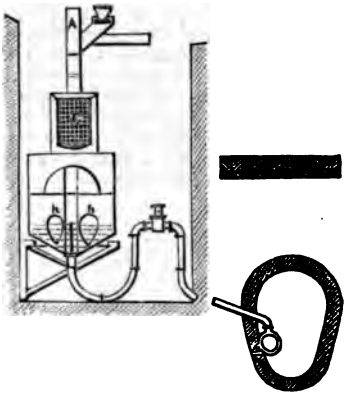
Claim.—1. The bowl having its annular chamber and hooked annular projection, with its upper notches or recesses, the front water outlet, and rear force pipe leading from the annular chamber and entering at the bottom of the bowl. 2. In combination with a water-closet bowl, the cast iron or metal base plate having flange and socket, as and for the purpose set forth and described.

272,020. TRAP: JOSEPH BENNOR, Philadelphia, Pa. Filed June 8, 1882.



Claim.—1. A valve for stench traps, &c., composed of a rubber ball, E, having an inclosed loose metal ball, F, the diameter of which is less than ball E, and yet is of such extent that it prevents the ball E being forced through its seat or into the pipe sealed thereby. 2. In combination with body B, having top and bottom plates with interposed gaskets or packing-rings, a yoke, C, constructed and arranged to hold said parts together. 3. The combination with body B, top and bottom plates, B^1 B^2, and eduction and induction pipes D D^1, of a valve, E, loaded at F, substantially as shown and described.

272,405. WATER-CLOSET, URINAL, AND CESSPOOL: JEAN BAPTISTE BERLIER, Paris, France, assignor to the Compagnie Générale de Salubrité, same place. Filed Aug. 9, 1882. Patented in France March 14, 1881, No. 141,763; in Belgium Oct. 31, 1881, No. 56,103; in England Nov. 2, 1881, No. 4,800; and in Italy June 30, 1882, XXVIII., 306.



Claim.—1. The combination of the tank B with soil-pipe A, inner perforated cage, C, lower discharging-tank, and communicating pneumatic suction-pipe. 2. The chamber B, combined with inner perforated cage C, having internal prongs. 3. The discharge-tank, combined with the exhausting discharge-pipe, upper supply-tank, and valve *h*, carrying a float or floats, substantially as and for the purpose specified.

NEW INVENTIONS.

DISINFECTION BY STEAM.

IN the SANITARY RECORD of October 15, 1881, will be found a detailed account of an apparatus invented by Mr. Washington Lyon of the Asylum Road, Old Kent Road, for disinfecting all kinds of textile fabrics, furniture, papers, &c., by steam, which paper was afterwards published by Mr. Lyon in pamphlet form and largely distributed. Mr. Lyon is a partner in the firm of Messrs. J. A. & W. Lyon, who have carried on an important business for two generations as bleachers, cleaners, and calenderers, and brings an amount of practical knowledge to bear upon the question of disinfection. Therefore in the year 1867, when the cholera was epidemic in London, Mr. Lyon was elected chairman of the committee formed in his own district (where at one time it threatened to become serious) to endeavour to arrest its progress, and he was enabled to offer advice and render material assistance which, if it did not at the moment stamp out the disease, was certainly the means of retarding its progress. Since that time he has given his attention to improving the processes of purifying and disinfecting, and the apparatus which we described at the date named is the result of his labours. This patent differs so materially from all other disinfectors that it deserves most careful consideration. This difference consists in the application of the moist heat of high pressure steam as opposed to a dry heat for disinfecting purposes, which enables a higher temperature to be applied without injury to the most delicate fabric, and by the application of this higher heat to entirely annihilate all germs of disease. Apart from the question of cholera, we are induced to

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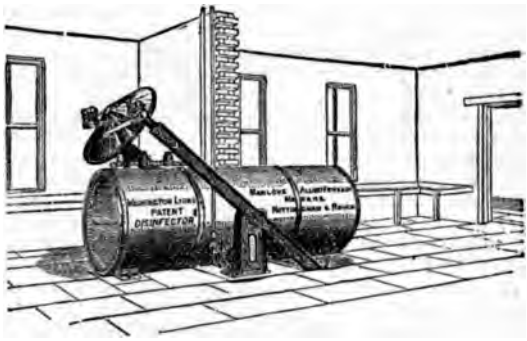
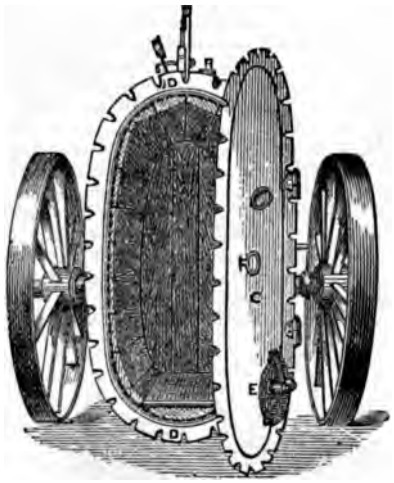
return to the consideration of this method of disinfection as the result of a series of comprehensive tests which were carried out some time since at Messrs. Lyon's works, by order of the Local Government Board, by Dr. H. Franklin Parsons with the patent disinfector, in reference to an outbreak of small-pox that occurred amongst the rag sorters at the St. Mary Cray Paper Mills, the object also being to see what precautions could be taken to prevent the spread of infection from rags. Dr. Parsons' report leaves no doubt that the epidemic was attributable to the rags, which it appears are sometimes of the most offensive character, being not only the cast-offs from poultices, &c., but in some instances containing undoubted appearances of human excrement. Dr. Parsons' view is strengthened by the fact that no concurrent outbreak of the disease occurred in the neighbourhood among persons unconnected with the mill. The report goes on to recommend that all rags should be disinfected before the process of sorting is carried out, since it has been clearly demonstrated that the danger lurks in this preliminary separation, which it appears must be done before any of the cleansing processes adopted by paper manufacturers are carried out. In reviewing the available modes of disinfection Dr. Parsons recommends that method applied in the form of high pressure steam, as securing the rags against scorching, and of greatly shortening the time required for the penetration of the heat, and he goes on to say that from experiments he has made it is practicable with steam at 15 lbs. pressure (=251° F.) to disinfect rags without unpacking the bales, an important advantage both as regards saving of labour and avoidance of risk. The texture of the rags is not injured, they would not be wetted to a serious extent by the steam, and the cost of the process would not exceed 2*s.* 2*d.* per ton of rags, even if it were necessary to erect special apparatus for the purpose. Mr. Lyon's appliance is the available one alluded to. But it is quite possible, and indeed is constantly done, to apply as much as 20 lbs. pressure (261° F.) in the Lyon's disinfector without injury to the most delicate and even coloured fabrics. As it is well known that few textile articles will bear a dry heat of more than 250° F. without becoming scorched or singed, or, in other words, virtually destroyed, the advantages of steam disinfection, where a so much higher temperature can be obtained, is of immense importance. We are glad to see that the Board of Trade, by the advice of Dr. Buchanan, medical officer to the Local Government Board, have issued further regulations with reference to ships having on board bales of rags exported from Egypt and consigned to this country. As it has been found that thousands of tons of rags are annually imported here from Egypt, and that they are habitually dirty, it has been thought advisable to take exceptional precautions to prevent the introduction of cholera by means of them into English ports. In ordering disinfection, Dr. Buchanan says that bales of rags cannot be properly disinfected by the use of any powder, nor by gaseous sulphurous acid or chlorine, and after stating that they must be exposed to a heat of not less than 250° F. for two hours, says that 'the arrangement which gives greatest penetration of heat, is the use of high pressure steam, more especially if the pressure be from time to time relaxed, and reapplied so as to displace the air.' Here again the Lyon's patent disinfector is evidently alluded to, and the 'relaxing' system mentioned by Dr. Buchanan is one of the salient features of the machine. That paper manufacturers will appreciate the steam disinfector is without doubt, as placing within their reach a reliable, easy, and inexpensive mode of ridding themselves and their workpeople of one of the most dangerous features connected with their trade, so far as the spread of infectious diseases is concerned. A large sum is annually lost under present circumstances by burning the clothing and bedding of persons who have suffered from infectious disease, and we are informed that last year in the Bethnal Green district a loss of no less than five hundred pounds was thus entailed, which, had a Lyon's disinfector been in use, would have been saved. Thus there is reason to recommend it as an economiser of property as well as a safeguard to health. Drawings of the apparatus are appended. The first consists of an oval horizontal cylinder, having an outer chamber or jacket into which steam is first admitted to heat the machine and thus prevent condensation



in the inner chamber into which the articles for disinfection are placed. The door is then closed with a steam-tight joint and steam turned on to the inner chamber. Gradually the gauge on the outside is seen to rise, registering the amount of pressure and consequently heat from time to time enforced. This is continued as long as necessary, when the steam is turned off and allowed to escape into a tank or the open air. There is a very slight dampness upon the goods, and this is got rid of by allowing them to remain a few minutes in the machine with the steam on the outer casing only, thus converting the apparatus into a drying chamber. The second drawing represents a disinfector as made for the interior of hospitals, or such places where a permanent one is required. Here it



assumes the form of an elongated cylinder, and is to be fixed in the rooms, divided by the party wall, one half in each room. The object of this is to guard against contagion, the persons who place the infected articles in the apparatus in the one room being quite apart from those who take them out when purified in the other room, the arrangements of the appliance and its working being the same in both cases. We learn with satisfaction that since we recommended this apparatus many of these disinfectors have been adopted in different parts of the country, and that many medical officers of health are using every exertion to have them adopted in their various districts. In

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the interests of the public health it is to be hoped that this description of the process, coupled with the action of the Local Government Board, will be the means of giving an impetus to the speedy and more general adoption of the Washington Lyon Disinfector.

THE ELECTRO-GLACIAL APPLICATOR.

THIS ingenious invention—a brush containing an efficient electric battery in the back, of which we gave a description in the SANITARY RECORD of June 15, in connection with our report of the National Health Society's Exhibition, at which it was exhibited and where a medal was awarded it by the judges, who were well-known medical men—has already been applied to more varied uses. In addition to the hair and flesh brushes in different forms described, the inventor, Miss McMullin, has introduced a horse brush, containing a battery powerful enough to ring a 5-inch gong, and a smaller one, of less powerful proportions, for use on dogs. Although Miss McMullin originally invented the brush for the use of persons afflicted with neuralgia, from which she was herself a great sufferer, she has an opinion that its use is equally adaptable to individuals in ordinary health who have to undergo great bodily or mental fatigue, and even suggests that its effects will be equally salutary to the overworked animal as to the human frame; hence the introduction of the brushes above described. These views must be taken for what they are worth. Miss McMullin has recently had completed for the Princess Christian of Schleswig-Holstein two handsome hair brushes of different sizes, very neatly mounted and arranged in a leather case, containing also the fluids and tube for recharging the battery.

STEAM-POWER WASHING MACHINERY.

THERE is no firm in the kingdom to whom the public are so much indebted for the introduction of, and improvements in washing machinery as to Messrs. Bradford & Co., of Manchester and London, and the term laundry engineering has been very appropriately applied by them to that portion of their extensive business. Within the recollection of many, washing machinery was scarcely known, and it is due to the exertions of this firm in a great measure that it has become a great industry, employing many thousands of hands, using vast quantities of material, and easing the labour of a large class of hard-working women. At the recent meeting of the Royal Agricultural Society at York Messrs. Bradford exhibited some new apparatus worked by steam-power, capable of effecting an immense amount of work, and adapted for asylums, workhouses, and all large public institutions. The machine in question, of which an engraving is affixed, embraces all their latest improvements, including

the 'mid-feather' action, also applied by Messrs. Bradford to certain churns manufactured by them, and a new patented feature in the form of a diaphragm, these arrangements being calculated to effect a more expeditious and convenient mode of cleansing the linen entrusted to the machine. To ensure this important result the driving is so constructed that it will reverse the motion of the washing compartment every two or three minutes, as may be desired, automatically and without personal attention. The inventors are so confident of the success of the apparatus, even when put to the most severe tests, that they offer in all cases to send it out upon approval, being perfectly satisfied that the results will secure its permanent adoption. It is specially adapted for the requirements of asylums, hospitals, and large public institutions. We are pleased to learn that Messrs. Bradford have been awarded the Gold Medal at the Amsterdam Exhibition.

LAW REPORTS.

VACCINATION DISTRAINTS.

AN important test case regarding vaccination distraints has been decided by the judge at the Leicester County Court. A tradesman, named Mr. Pratt, sued four police-officers for damages for excessive distraint under the following circumstances:—Mr. Pratt objected to have his child vaccinated, and was summoned before the magistrates and fined 10*s.* and costs. This he declined to pay, and the defendants, in pursuance of a magistrate's order, seized his goods to the value of over 12*l.* All the goods were sold by auction, and after paying all expenses 3*l.* 3*s.* was handed back to the plaintiff as the balance. Mr. Wright, solicitor, called witnesses on behalf of the plaintiff, who proved the value of the goods seized, and he submitted that the seizure was excessive, and damages ought to be awarded. Mr. J. B. Fowler, solicitor, contended on behalf of the defendants that there was always a riot at such sales, and twenty policemen could not protect the auctioneer from personal violence, and consequently the goods had to be sold for far less than their value. He submitted that the seizure was a proper one. His Honour, in giving judgment, said if twenty policemen were not sufficient they ought to get 100 police to keep order at these sales. He deeply regretted that persons were insensible to the great blessings which vaccination had conferred on the country, and that they paid heed to agitators who went up and down the country for the purpose of making political capital out of the agitation. Still, however misguided these persons were, that did not justify the police in seizing 12*l.* worth of goods, or even 2*l.* or 3*l.* worth of goods, to cover a fine of a few shillings. He therefore gave judgment for the plaintiff, damages 7*l.* and costs. This decision is of importance, because many other actions involving the same principle in various parts of the country depend upon it.

SMOKE ABATEMENT.

At Wandsworth, Mr. William M'Murray, of the Royal Paper Mills, Wandsworth, was summoned in respect of his furnaces, which were not constructed to consume the smoke. The summons had been adjourned for further observation on the premises. Mr. W. R. E. Coles, the Government engineer, said the best practical means had not been taken to prevent smoke. Mr. Sheil fined the defendant 5*l.*, with 2*l.* 14*s.* 6*d.* costs.

A STITCH IN TIME.

At the Birmingham Police-court William Lloyd, bailiff, was summoned, at the instance of Mr. T. H. Dale, Chief Inspector of Nuisances, for removing to certain auction rooms for the purpose of sale certain bedding clothing, two beds, one pair of palliasses, one pillow, a quantity of loose linen, and one stuffed chair, which had then lately before been exposed to scarlet fever.

Defendant went to a certain house to execute a distress warrant in company with two other bailiffs. Before removing the goods a neighbour told the defendant not to remove the bedding, because of there having been scarlet fever in the house. No notice was taken of the warning, however, and the goods were conveyed to the auction

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rooms. Information was given to Mr. Dale, who immediately went to Watson's rooms and ordered the goods to be disinfected, Mr. Dale explaining that had the goods been removed from the rooms there would have been great danger of scarlet fever being spread, as the articles would have been sold in lots. A fine of 5*l.* and costs was imposed, amounting altogether to 6*l.* 4*s.*; in default one month's imprisonment.

Disobeying a Magistrate's Order.

Charles Payton was fined 40*s.* and costs for disobeying a magistrate's order directing him to abate a nuisance on property belonging to him.

At the Birmingham Police-court, John Lorgorio, lodging-house keeper, of Bordesley Street, was summoned at the instance of Mr. T. H. Dale, Chief Inspector, for allowing the sexes to be mixed in his house on the 11th ult. A fine of 40*s.* and costs was imposed, or in default one month's imprisonment.

BRIEF NOTES OF USEFUL CASES.

Landlord and Tenant.

1882. *Allum* v. *Dickenson.* Paving Expenses—'Metropolis Management Amendment Act, 1862,' § 96—Held not a 'Rate,' but a capital outlay, and therefore not recoverable by the owner from his tenant in spite of covenants in lease that tenant was to pay all 'Rates.' (46 J.P., 262.)

Market.

1882. *A. G.* v. *Norwich Corporation.* Application at the relation of a town councillor for an injunction to restrain Corporation from letting a part of its market lands as a site for an agricultural hall—Application refused, it not being shown that the proposal was objectionable. (*Times*, May 22, 1882.)

Costs.

1882. *A. G.* v. *Bermondsey Vestry.* Practice—Costs—Action against corporation—Where costs are not asked for against a corporation it is irregular to make individual members of the corporation defendants solely for the purpose of saddling them with the costs of the main proceedings. (51 L.J., Ch. 848; 46 L.J., 852.)

Artisans' Dwellings.

1882. *Barnet* v. *Metropolitan Board of Works.* 'Metropolitan Building Act, 1855,' § 80: 'Artisans' Dwellings Act, 1875.'—Dilapidated premises, notice to take which had been served on owner—Owner held liable for emergency repairs, notwithstanding that proceedings for compulsory sale were pending, and were brought to a close only three days after the expenses for repairs, &c., were incurred. (46 L.T., 384; 46 J.P., 469.)

Local Government Board.

1881. *Barker* v. *King's Norton Rural S. A.* 'Drainage scheme.'—Application for injunction to stay—demurrer that relief could be had when the local inquiry was held by Local Government Board—Demurrer allowed on the ground that the Board had full power to deal with plaintiff's case. (W.N., 1882, p. 14.)

Urinal.

1882. *Baker* v. *St. Pancras Vestry.* Injunction to restrain erection of urinal, refused.—*Per* Jessel, M.R.—'A wide street is a much more suitable place for a urinal than a narrow, quiet street.' (*Times*, July 29, 1882.)

Paving Expenses.

1882. *Birkenhead Corporation* v. *Crowe.* Special Act altering the general law as to the incidence of paving expenses—Held, that though the date for the alteration to come into force had (unknown to the defendants) been postponed during the passage of the Bill through Parliament, the defendants could not claim the benefits which the Bill as originally drawn would have conferred on them. (46 J.P., 551.)

1882. *Newington L. B.* v. *Wright.* Paving Expenses—Capital outlay duly paid, but payment of interest refused—Interest and costs of the action ordered to be a 'charge' on the premises, under §§ 150 and 257 of the 'Public Health Act, 1875.' (*Times*, Jan. 23. 1882.)

1882. *Sunderland Corporation* v. *Alcock.* 'Public Health Act, 1875,' § 257.—Paving expenses remain a charge on premises, and may be enforced against the owner for the time being, even though the premises have changed hands and no summary proceedings were taken against the owner who was such when works were completed. (51 L.J., Ch. 546; 46 L.T., 377.)

1883. *Wake* v. *Sheffield, Mayor.* 'Public Health Act, 1875,' § 150—Works on private lands not part of street—Jurisdiction—Powers and duties of an arbitrator—Apportionment upheld. (At Q. Sess.) (47 J.P., 185.)

Accident to Sewer.

1881. *Dewsbury Corporation* v. *Batley Corporation.*—Accident to culvert maintained jointly by two united authorities—Action by landowner against them—Union dissolved by Act of Parliament after the accident, but before the action—Held, that the one Corporation which had bought out the other, and taken over all the liabilities, could not recover contribution, the matter not having been brought before the arbitrator appointed to settle accounts at the dissolution. (*Times*, June 4, 1881.)

Diseased Meat.

1882. *Eaglesfield* v. *Teasdale.* 'Public Health Act, 1875,' § 117.—Charge of having diseased meat dismissed by justices—Held that no appeal against the dismissal lay to the Quarter Sessions. (At Q. Sess.) (46 J.P., 744.)

Contract.

1882. *Lawson* v. *Wallasey, L. B.* Contract for Works. Powers of Board's engineer to authorise delays and additional works and bind his employers. (47 L.T., 625.)

Liability for Accidents.

1882. *Murley* v. *Grove.* Private road. Accident to trespasser by falling into a hole—Landowner held not liable to any person using the road without a license.

1882. *Scott* v. *Huddersfield Corporation.*—Corporation held liable for accident to horse passing along a highway newly asphalted and therefore unusually slippery. (*Times*, Dec. 7, 1882.)

Water Powers.

1882. *Newhaven Water Company* v. *Newhaven L. B.* 'Public Health Act, 1875,' § 52—Action to restrain board from constructing waterworks—Company formed but no works yet in operation—The evidence showing a *bonâ fide* probability that the company would be able to fulfil its promises, injunction granted. (*Times*, Jan. 21, 1882.)

1882. *Sheffield Water Co.* v. *Carter.* Powers of water company as to cutting off supply—Failure of occupier to pay, or tender, rate in advance. (51 L.J., M.C., 97; L.R., 8 Q.B.D., 632; 46 J.P. 548.)

Parochial Election.

1882. *Reg.* v. *All Saints', Newcastle, Vicar.* Poll for election of overseer—Great confusion and overcrowding, yet no corruption or conspiracy to prevent a fair election proved—*Mandamus* to convene vestry for a new election refused. (*Times*, April 5, 1882.)

Rates.

1882. *Smith* v. *Lambeth Assessment Committee.* Tenant of railway book-stalls held not rateable in respect of them, there being no exclusive occupation. (52 L.J.,

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M.C., 1; L.R., 10 Q.B.D., 327; 48 L.T., 57; 47 J.P., 244.)

STREET.

1882. *Newport Urban A.* v. *Graham.* 'Public Health Act, 1875,' § 150—Back of premises held to 'abut' on a new street, although inaccessible from that street, owing to a difference of level of 5 feet. (L.R., 9 Q.B.D., 183; 47 L.T., 98.)

HIGHWAY.

1882. *Oxenhope L. B.* v. *Bradford, Mayor.* 'Public Health Act, 1875,' § 216—300 yards of stone kerbing held not to be 'public works of paving' so as to render, under the 'Public Health Act, 1875,' § 215, a highway rate invalid. (47 J.P., 21.)

BUILDING LINE.

1881. *Paddington Vestry* v. *Snow.* 'Metropolis Management Act, 1862,' § 75—The certificate of the architect does not necessarily create the building line, or the offence of building beyond such line—Limitation of time—*Morant* v. *Taylor*, and *Wandsworth* v. *Hall*, followed. (45 L.T., 475; 46 J.P., 87.)

CONTRACT.

1882. *Reg.* v. *Norwich, Mayor.* 'Municipal Corporation Act, 1837,' 1 Vict., c. 78, § 44; 'Public Health Act, 1875,' § 174.—Street paved by different contractors—No contracts under seal—Separate items under 50*l.*, with one exception—The work being useful and the prices reasonable, the Court held that there would be no misapplication of the borough fund, and refused to forbid the payment of the bills. (46 J.P., 308; *Times*, May 6, 1882; W.N., 82, 74.)

LEG. PROCEEDINGS (JUSTICES).

1882. *Reg.* v. *Winchester, JJ.* 'Building By-laws.'—Certain members of an urban authority, being also justices, took part in a meeting whereat it was resolved that a roof was to be pulled down—Some of the same justices heard the case, and ordered the builder in default to be fined—Order quashed on *certiorari*, and the justices who acted in both capacities to pay the costs. (46 J.P., 724.)

L. G. B.

1882. *Reg.* v. *Local Government Board and Taylor.* 'Public Health Act, 1875,' §§ 150, 257, and 268—Paving expenses—Apportionment—Notices of demand—Decision by local authority—Appeal by party aggrieved—Time for appeal—Memorial to Local Government Board—Grounds of appeal—Prohibition held not to lie under the circumstances—*Semble* that it would lie where Local Government Board was exceeding its powers. (52 L.J., M.C., 4.)

INTEREST OF JUSTICES.

1882. *Reg.* v. *Lee.* 'Public Health Act, 1875,' §§ 116 and 258—Conviction—One of the convicting magistrates chairman of the committee which directed the prosecution—Conviction quashed—§ 258 does not apply to such a manifest case of bias. (L.R., 9 Q.B.D., 394; 30 W.R., 750; [*Reg.* v. *Yorkshire W.R. JJ.*] 46 J.P., 404.)

NUISANCE.

1881. *Smith* v. *Taylor.* Nuisance—Burning of bricks—Promise that nuisance was only temporary—Circumstances under which apparent acquiescence in a nuisance will not disentitle an aggrieved party to redress. (*Times*, Dec. 3, 1881.)

UNWHOLESOME FOOD.

1882. *Williams* v. *Navierth S. A.* Meat sold in July condemned by medical officer, but not till next day after it had been sent home—Conviction quashed—The 'Public Health Act, 1875,' §§ 116-7 only authorises seizure when food is exposed for sale, and a conviction when it is found at once to be unsound. (*Times*, Dec. 7, 1882.)

REVIEWS.

(*Continued from page 435, vol. xii.*)

Handbuch des öffentlichen Gesundheitswesens. By DR. HERMANN ETTLENBERG. Vol. II. Berlin: Hirschwald. 1882.

NAVAL HYGIENE.

NAVAL Hygiene is from the pen of Dr. Reincke, of Hamburg, whose official connection with that port gives weight to his opinions. He avoids statistical details and writes mainly with a view to the economy of emigrant ships, which play so important a part in the history of epidemics. After noticing the abnormal conditions of life at sea, and the frequency among seamen of consumption, rheumatism, and diseases of the kidneys, as well as others which are preventable or incident to tropical climates, he divides the subject before him under the heads of: 1. The maintenance of cleanliness. 2. Dryness on board ship. 3. Ventilation. 4. Cubic space and accommodation. 5. Diet. 6. Supply of pure water. 7. Avoidance of infectious disease. 8. Care of the sick. Having discussed the source and composition of bilge water, he recommends daily pumping and flushing of the bilge with fresh sea water, and disinfection with zinc chloride at regular intervals, in the case of short passages as across the Atlantic, before departure, and on arrival. He censures the use as ballast of builders' rubbish, sea sand, and fragments of rocks with seaweed and marine animals attached, insisting very properly that only clean dry stones or old railway metals should be permitted. Like our countryman, Dr. Macdonald, he severely condemns the constant swilling of the lower decks of men of war with sea water, the salt of which remaining behind keeps the air perpetually damp.

He does not describe the special mechanical arrangements for artificial ventilation, though expressing his preference for aspiration over propulsion as less likely to drive foul air into the parts occupied by crew or passengers. Natural ventilation or perflation by shafts and cowls he treats more fully, especially insisting that each compartment or enclosed space should be ventilated as a unit independently of others.

The regulation cubic space per head in English emigrant ships he considers the least compatible with health; that in German ships (70·80 cubic feet) being totally indefensible. He strongly deprecates the universal practice of a reduced estimate for children, the more so since among 100 emigrants there are on an average five or six infants under a year, and 17·18 children under ten years.

The directions he gives for the general arrangements as regards eating, sleeping, washing, &c., and of the space between decks occupied by emigrants and the daily inspections, are excellent. Considering the dirty habits of many, he urges that new sacks stuffed with clean straw for beds should be served out for each voyage. The victualling of war and emigrant ships, and the modern advances in this matter, are treated by him at some length. In this respect the German emigrant service compares favourably with ours, their dietary being more liberal and varied. The provisions for the prevention and treatment of disease in emigrant ships are, he asserts, everywhere defective; and he concludes his paper with a few suggestions for deck hospitals and other medical appliances. We may observe that he repeatedly mentions Capt. Cook as the father of naval hygiene, and in advance not merely of his own but of later times.

QUARANTINE.

Dr. Reincke's article on 'Quarantine' is a masterly and complete digest of the subject in all its bearings. First practised by the Venetians in the fifteenth century as a precaution against the plague, quarantine had been greatly neglected until the invasion of Europe by cholera fifty years ago, and the more recent extension of yellow fever to the southern shores of the continent. It is founded on the universal belief that migratory epidemics are carried

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by human intercourse, and certainly if all communication whatever with an infected district could be stopped it would succeed in its aim. But so clearly is this impracticable on commercial grounds that the conferences assembled for its discussion in 1852 at Paris, in 1866 at Constantinople, and in 1874 at Vienna, were, on the whole, unfavourable to the practice. With the cattle plague it was found that nothing short of the slaughter of all diseased and suspected animals, with destruction of all fodder, &c., with which they had come in contact, would suffice, and such procedures are obviously out of the question with human beings. Again, the aggregation of affected and suspected persons in lazarettos may tend to the creation of new and dangerous foci of disease; and lastly, the protection of long lines of inland boundaries is found in practice to be perfectly futile. The question of quarantine resolves itself, therefore, into the prevention of the importation of disease by ships, and it is to a great extent feasible in the case of islands or as between distant continents. In narrow seas, as the Channel and Archipelago, the difficulties are scarcely less than on land; but even where the circumstances are most favourable we are met by the diversity and inconsistency of the regulations of adjacent countries, and the systematic evasion of these by the owners and masters of vessels. It must be remembered, too, that besides the introduction of the contagion or disease germ, there must be a suitable soil prepared for it. This is too little recognised in those southern lands where the belief in quarantine is strongest.

The most effective measures for the prevention of epidemics are—(1) Improved drainage, dwellings, food, clothing, and sanitary and social conditions of the population, especially of large towns. (2) Suppression of the first appearance of infectious diseases by removal or isolation of persons, and disinfection of houses and things. (3) Sanitary supervision of the great lines of traffic, especially by sea, with detention of diseased and suspected persons, goods, and ships.

Quarantine involves the two latter means. It must, however, not be imposed wildly, but undertaken with a definite purpose, and directed at special diseases in their places of origin. So practised, it has proved a real success—as in the case of the plague at Astrakhan, the yellow fever in the United States, and the cholera ship *Elwood Cooper*, which left Hamburg in October 1873, but was arrested at Cuxhaven on her way to America. For this a scientific knowledge of the etiology of a disease, its mode of propagation, and its existence and progress in every part of the world up to within a few days, is absolutely necessary; and to attain this the co-operation of the Government of every country, and the establishment of points of observation in all directions are necessary. Thus only can such errors be avoided as the introduction of cholera into America in 1872 by Polish emigrants, the ports whence they sailed from Germany being free; or the infection of many German ships with yellow fever in 1876–77 in Brazil, the returns from Rio being some months in arrear and the epidemic at Santo never reported at all. But of most importance is the selection of the 'gates of irruption' for special observation: such are Suez, the Caspian ports, and those ports in Europe and America between which the lines of emigrant ships mostly or solely run. Lastly, no measure should be undertaken which cannot be rigorously enforced, and once adopted such must be carried out relentlessly.

In the so-called revision or inspection of ships a record must be obtained of the day on which the vessel left, the port of departure, and where and when it touched in its passage, what passengers or goods it took on board, what cases of sickness have occurred, and at what intervals, or in what part of the ship and among what class of persons. In making these inquiries the utmost vigilance and suspicion must be exerted, since the truth is apt to conflict with the interests of all parties on board. Even a clean bill of health must not be accepted without investigation, for ships may have called at infected ports, or there may have been deliberate concealment of facts, as when the French troopship *Corrèze* entered Suez with a clean bill, although cholera was raging at Saigon when she left on July 18, 1877, and before her arrival at Suez on Aug. 24, sixty cases, with thirty deaths, had occurred on board!

When a ship arrives from an infected port, if the passage have taken a longer time than the incubation period of the disease in question, and no case have occurred on board, she may be passed as clean; so also, as a rule, if that period has elapsed since the last case has recovered, the crew and passengers may be allowed to land, though precautions must be taken against the retention of infection in fomites. For instance, the *Anne Maria* sailed from America to St. Nazaire, no case of yellow fever had occurred in her passage of thirteen days, and the crew, who went on shore, remained in health; but immediately on opening the hatchways, almost all the men employed in landing the cargo were attacked.

If the passage were of shorter duration they should be detained a few days. But if there be cases on board, the sick must be removed to an isolated hospital, and the healthy detained for the incubation period in some other equally isolated place. Should any sicken, they should be at once transferred to hospital, and the detention extended for another like period. This term is—for the plague, seven to ten days; for yellow fever, six; and for cholera, one or two only. Nothing is gained by longer quarantines, for Dr. Reincke does not believe in prolonged incubation, the alleged cases being, he thinks, rather instances of deferred infection. Disinfection of clothing with personal ablution will provide sufficiently against this contingency. The treatment of the cargo must vary with its nature; packing-cases, hardware, &c., need only airing; wool, hides, and the like demand thorough disinfection, not the farce practised in some places. An actually infected ship should be purified by pumping out the bilge, flushing the hold with zinc chloride, removal of partitions and of planks here and there, and disinfection by sulphur, or other gaseous disinfectants, as in the case of infected rooms. If none of the men employed at the work sicken within the incubation period, she may be considered safe.

Quarantine stations need not be established at every port but only at one for each coast. There should be an anchorage removed from that used by other vessels, an isolated lazaretto—on an island where possible—or a ship may be used for the purpose, or a temporary hospital erected on a solitary site, a similar retreat for suspects, disinfecting chambers, and a warehouse for the airing of cargo. A special medical staff of course is needed. Only a rigid system of inspection, not a lengthy quarantine, on the Red Sea can protect Europe from the invasion of cholera in that quarter, but the elaborate recommendations of the International Sanitary Commission appear to Dr. Reincke like directions for the punctual administration of doses of a *placebo* of inert medicines.

Tea and Coffee.

Tea, coffee, and alcohol, are treated in a single article by Dr. Binz of Bonn, whose therapeutical researches are well known, and who has devoted much inquiry to the physiological action of alcohol (see SANITARY RECORD for Jan. 15, 1883, p. 303). The consequences of excess had already been discussed in Vol. I. under the head of 'Alcoholism.'

As to the influence exerted by tea and coffee, *i.e.* by their common active principle, caffein, on the metamorphosis of tissue—or, as it is more concisely called, metabolism—opinions, says Dr. Binz, are divided; some, as Böcker, J. Lehmann, Hammond, Jomand, and Rabuteau, maintaining that it is lessened, and others, as C. G. Lehmann, Frerichs, Voit, Hoppe-Seyler, and Roux, asserting that it is increased thereby. Eustratiades found in his experiments a notable diminution, Hoppe-Seyler a trifling increase, of urea. Those of Voit and Roux are more numerous, and the latter found the urea, uric acid, phosphoric acid, and chlorine, especially the first and

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last, constantly augmented, but he remarks that the excretion of chlorine depends on the total quantity of urine passed, and consequently on the fluid drunk. After a time toleration is established and these are secreted in normal amount. In this connection we may place the close relation which subsists between the formulæ of caffein and uric acid. In short there is no real evidence to show that tea and coffee can be considered as *sparmittelen* or means of checking metabolism.

Caffein indubitably acts as a stimulant to the brain, respiration, circulation, and bodily heat, and differs from alcohol in the absence of subsequent depression.

Binz has himself investigated the action of caffeol, the essential oil, and finds that it doubles the frequency and depth of the respirations, increases the heart's impulse and the pulse by one-third; but the blood pressure is unchanged, for the arteries are at the same time dilated. To this increase of the superficial circulation the sensation of warmth is due. Too long continued this excitation of the heart and nervous centres may be hurtful, and in many persons dyspepsia results.

Still, since some such stimulant is instinctively sought by all, especially the poor, it is highly desirable that the use of tea and coffee in place of alcohol should be encouraged. Dr. Binz suggests that the Paraguay tea (Ilex Paraguayensis), which contains the same principle as tea and coffee, and is used by all classes in South America, might be introduced into Europe with advantage. Should a taste and demand for it be created, the forests of Brazil could furnish an unlimited supply at a very low price.

Alcohol, on the other hand, is not only a stimulant, but checks tissue change. In a healthy, well-nourished, and not overstrained organism this latter action is quite unnecessary. Dr. Parkes found that teetotal soldiers were fully as capable of fatigue and hardship as their comrades, although at the end of a long march small rations of rum seemed to exert a good effect on the general condition. In small and oft-repeated doses alcohol is undoubtedly a respiratory food, being consumed in and instead of the tissues themselves. The total calories evolved by a healthy adult in twenty-four hours are 2,200, and 100 grammes of absolute alcohol freely diluted produce no less than 710 calories. In short, its heat-producing power is double that of fat, and its combustion far more rapid. It is true that the subjective feeling of warmth is illusory, depending, as in the case of tea and coffee, on the dilatation of the capillaries in the cutaneous circulation; but the instinctive craving for alcohol felt by men exposed to inclement weather and hard labour on a poor and indigestible diet is doubtless explicable quite as much by its speedy utilisation in the system and its tissue-saving (*sparend*) power. Riess, one of the latest investigators of this question, found that small and repeated doses, while exerting no action on the temperature, pulse, or digestion, reduced the urea 18 per cent., chlorides 17, phosphoric acid 22, and the sulphuric action 12.

Anstie and Dupré, Heubach, and Aug. Schmidt have totally refuted the assertions of Perrin and others that alcohol is excreted unchanged. This is the case as regards the urine only when enormous doses are taken, while the odour of the breath commonly held to be alcoholic has been shown by the German observers to be that of the more volatile ethers accompanying it.

It is also a stimulant, but followed by a corresponding reaction, which renders it unsuitable as a dietetic stimulant for troops on active service. Herein lies the superiority of coffee, now generally recognised by military men; but so long as alcoholic liquors are used, whether in civil or military life, their purity should be a matter of anxious care; for, as Dr. Brockhaus has shown more accurately than previous experimenters, the bye-products of fermentation are infinitely more hurtful than alcohol itself.

Gymnastics.

The practice of gymnastics has long been followed in Germany with an enthusiasm and a method unknown elsewhere, partly, perhaps, in the absence of such games as cricket and football, but mainly because since the Academic Legion, or Jahn's Athletes, led their countrymen to victory in 1813, it has been viewed, as among the ancient Greeks, as a powerful means of training her sons for the defence of their Fatherland. It is only within the last few years that its value has been appreciated in the armies of England and France. The article 'Turnen' is the joint work of a physician and a practical teacher, Dr. Ed. Angerstein and G. Eckler. Taking the term in its widest signification, the former insists on the necessity of paying due regard to age, sex, health, occupation, &c., of the pupils, in fact, of following a strictly scientific method, and divides the subject into school exercises for boys and girls respectively, for men in general, for women, for soldiers and firemen, and special exercises to improve the health of feeble children, or for the cure of actual deformities (orthopædics).

He discusses the physiological action of exercise on the nutrition and innervation of every organ of the body, and even on the moral character, and then proceeds to treat of the methods, advantages, and possible dangers of each form of gymnastics, with or without apparatus, and of all other athletic exercises, as well as the *very few* conditions which can properly exempt young persons from *all exercises* whatever. Even the blind will gain in strength and decision, and deaf mutes in lung power by appropriate exercise. Mr. Eckler describes the construction and arrangements of a Turnhalle.

Pneumokoniosis.

In a long article bristling with references and statistics Dr. Birch-Hirschfeld discusses the diseases produced by the inhalation of dust (pneumokoniosis). Formerly the question was considered only in reference to the merely mechanical action of dust or its poisonous properties, as in the case of arsenic, &c., but the researches of Koch, and especially his discovery of the tubercle bacillus, have given a new feature to the question.

The greater frequency of tuberculosis among persons working in ill ventilated and dusty rooms is well known, but there seem now good grounds for believing that however much these conditions may favour the development of tubercle, and though dust *per se* may lead to various pulmonary disorders, actual tubercle originates in direct infection from the inhalation of the bacilli present in the atmosphere of such workshops. And this view is supported by the greater frequency of tubercle among persons working together in numbers than among those equally exposed to dust but following their occupations alone or at home.

In comparing the mortality from this cause of outdoor and indoor labourers we must not forget the fact that the former are naturally the more robust, and that the feebler take to the less laborious occupations of weaving, tailoring, cigar making, &c.

The diseases immediately brought about by the mechanical action of dust are quite distinct from tuberculosis, and are chiefly more or less chronic bronchial catarrhs, leading to bronchiectasis, emphysema, chronic catarrhal pneumonia, and consequent ulceration and destruction of lung tissue, interstitial pneumonia or cirrhosis of the lung—in fact all forms of non-tubercular phthisis.

Acute pneumonia, too, seems from the observations of Hirt to be much more frequent among persons employed in dusty trades, and more so when the dust is of a mineral than of an organic kind. Indeed, the greater irritation produced by the former apart from any chemical action or toxic property is well known. The majority of the particles, it is true, do not reach the ultimate divisions of the bronchi and are carried back by the cilia, so much so, that after a short absence from such exposure the whole are removed, and the effects must be mostly reflex, or conducted to the vesicles from the actual seat of irritation, but a portion does certainly remain. Inorganic and other particles are found in the expectorated cells, and *post mortem* in the cells and lymphatic vessels and

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glands. Merkel found in the lungs of needle grinders as much as 0·8 per cent., and Zenker 1·45 per cent of iron, while the ash of the lungs of workers on French mill-stones examined by Giesseler contained 34 per cent. of silica and 10 per cent. of alumina. To these conditions the names of anthracosis, siderosis, and chalicosis have been given. The inorganic particles are deposited in the upper lobes and around the root of the lung more than elsewhere.

Cotton dust tends to a form of pneumonia; and Zenker found among cigar-makers marked atrophy of the lungs, together with deposition of brown organic particles, though whether any connection subsisted between the two conditions cannot be proved. The remainder of the article is occupied with the consideration of preventive measures, as ventilation, the use of respiration, and means for intercepting or laying the dust.

The articles on particular industries are rather of a technical than of a sanitary character, and on some subjects, as sanitary engineering, conservancy of towns, and water analysis, we have better treatises in our own language; but we would gladly, did space permit, have given more of the contents of this 'Handbook,' or rather Encyclopædia, of all that directly or indirectly bears on public health, an epitome of nearly all that has been written on the subject, and including the most recent advances in pathology and chemistry in their relations thereto.

Where to take a Holiday: Reports on some Home and Foreign Health-Resorts, being the Holiday Number of the LONDON MEDICAL RECORD. London: Smith, Elder, & Co. 1883.

THE Editor of the MEDICAL RECORD has done good service to the large class of people who consider a holiday an essential element of the year's routine by putting together in a handy form the several papers on holiday subjects which compose this number. Those who take a holiday as a pastime, pure and simple, will find in it many valuable hints which may determine their choice of a locality in which to seek their pleasure, though it is not chiefly for such that these pages have been penned. For those who require a holiday on account of some temporary or permanent defect in health, and who may be doubtful of the health-resort most suited to the case in question, this collection of papers is likely to prove extremely useful. Both patients and their medical advisers may consult it with advantage. Almost all the chronic ailments in which change of scene, and air, and baths, are likely to prove beneficial are noticed by writers who evidently are thoroughly conversant each with the subject upon which he discourses. The several papers abound with information; and one finishes them with the thought that the writers have evidently been cramped for space, have had to compress the information at their disposal, and could have given more if not so restricted. One rises from the perusal of the various articles with the desire that they could have been longer.

The first paper is by Inspector-General Macpherson, and is entitled 'The Spas of Great Britain.' After some general introductory remarks, the writer classifies the various spas under the head of:—1. Bitter waters, specially noticing Cheltenham, Leamington, and Scarborough. 2. Salt waters, of which Droitwich is the chief representative. 3. Iron waters, chiefly found at Tunbridge Wells and Harrogate. 4. Indifferent and earthy waters, including Buxton, Matlock, and Bath. 5. Sulphur waters. 6. The Welsh waters, of which the chief is Llandrindod. 7. The Scotch waters. 8. The Irish waters. In conclusion, Inspector-General Macpherson notices that change of scene and mode of life, exercise in the open air, and freedom from cares of business, are all potent elements of cure. Dr. Hermann Weber contributes the second paper, which describes 'Continental Climatic Resorts in Summer,' under the two heads of Seaside Places and Inland Climates of the Continent, and it is crowded with information upon the best health-resorts of all European countries except those of the United Kingdom. These are described in the next paper, by Dr. Symes Thompson under the heading 'The Choice of English Health-Resorts.' He discusses the subject under four heads—'Conditions which determine Choice of Change,' 'Health-Resorts in General,' 'Seaside Health-Resorts,' and 'Inland Health-Resorts.' Dr. Charles Parsons contributes the next article on sea-bathing, which discusses the subject so fully as to leave very little more to be said thereon. In a paper on the 'Seaside Resorts on the Coast of Normandy from Dunkirk to Havre,' Dr. Vintras gives chatty information on some thirteen well-known localities; and Dr. Burney Yeo, in the following paper, describes the Pyrenean and adjacent summer health-resorts. This series of original papers is brought to a close by an article by Dr. George Thin on 'Summer Holidays at Sea,' which makes one think that many a worse locality for the spending of a vacation might be found than the deck of a large Atlantic steamer.

Next follows a lengthy report of some English and foreign health-resorts, which details particulars respecting the climate, water-supply, health-statistics, lodging accommodation, and general resources of typical English and foreign health-resorts, including Aberystwith, Aix-la-Chapelle, Barmouth, Bath, Blackpool, Bournemouth, Brighton, Broadstairs, Buxton, Dover, Filey, Folkestone, Great Yarmouth, Hastings and St. Leonard's, La Bourboule, Llandudno, Margate, New Brighton, New Shoreham, Teignmouth, Tenby, the Lake District, and Tunbridge Wells. Hints to travellers as to climate, apartments, exercise and recreation, drinking and food, diet in hot climates, and clothing; with a list of preparations useful for travellers; and reviews of some dozen recent guide-books to health-resorts bring to a close this extremely useful publication, which appears to us only to require to be well known in order to obtain a wide circulation.

Hygienische Tagesfragen, II. Die Kanalgase—its Sanitary Relations and Technical Management. By Dr. F. RENK, Munich. With twenty-five drawings.

I. *Sewer-Air.*—The observations of many authors on its chemical composition are given. Carbonic oxide may be an ingredient of sewer-air, but not of sewer-gas, for our au hor draws a distinction between the two, the latter being the emanations from decomposition. CO may obtain entrance into the sewers when broken gas-pipes are in their neighbourhood. Von Beetz's researches into the air of cesspools show the amount of CO_2, NH_3, and H_2S; von Levy's numbers indicate greater pollution. Cunningham and Lewis's Annual Report of 1872 is quoted on the presence of bacteria and spores of other low organisms; the same for Cohn and Miflet. The author has made examinations of the dust in the air of urinals, and found it very poor in low organisims.

II. *The Sanitary Import of Canal Gas.*—The idea that sewer-gas may spread cholera, typhoid, diphtheria, scarlet fever, ophthalmia, and such-like diseases, though gaining ground in England and America, has found no firm root in Germany. Renk agrees with Söyka and others who, as our readers know, are not in favour of the theory. Arguments are brought forward, and various authors cited in support of the view antagonistic to the idea of a spread of disease by means of sewer-gas, whether by predisposition of the organism, or by actual carriage of the germs. At the same time, our author does not hold that the breathing of sewer-gas is not injurious to health; he enters rather fully into acute and chronic poisoning by sewer-gas.

III. *The Conditions Favouring the Entrance of Sewer-gas into Houses.*—The different systems of house-drainage are divided into two classes, according as they are not, or are, provided with traps. In the *first class*, the principal elements concerned in the introduction of sewer-gas into houses are the difference of temperature and the wind. Pettenkofer and Eris made observations with anemometers on the rate of motion of the air escaping from water-closets, &c. The former, with a badly-closed cesspool and

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strong wind, found that a paper thrown into the drain remained suspended. Actual measurement gave 129,000 cubic mètres in twenty-four hours on one occasion, and at another time 518,400 cubic mètres in twenty-four hours.

The Second Class.—A water-trap consists of a peripheral and central limb, the latter being the last stroke of the U, in the ordinary form. Figures are given, which show schematically the condition of the water in syphon, bell, and other traps. The state of affairs is discussed when the pressure is greatest on the peripheral limb; (1) with small excess, (2) with great excess of tension, and when the stress is most on the central limb: (*a*) with little, (*b*) with great excess. It is shown, mathematically, that the most favourable case exists when the cross section of the central limb is greater than the peripheral; the worst, when the central limb is narrower than the peripheral. With the wide central-limb form of trap (1) the sewer-gas meets with the greatest resistance; (2) even if weakened, yet there always remains a relatively good trap; (3) the trap cannot be destroyed. The evaporation, too, is exceedingly slow, and so their especial value where dwellings are likely to remain empty for long together. A calculation demonstrates that the difference of temperature between air in house and that outside, cannot be taxed with the escape of sewer-air when a trap is present. Another reckoning shows that moist air is lighter than dry, but the moist air of sewers contains heavy CO_2. As Waring (*The Sanitary Drainage, New York*, 1876) has shown, even a moderate wind falling vertically on the outfall of a sewer can keep back the air so much as to storm traps. Given an air-tight model apparatus, the required velocity of the wind acting on the outfall in order to destroy the traps is calculated. A hurricane would be required to break a column of water 7 centimètres high, as in the simple syphon trap with limbs of equal width and 3·5 centimètres high. But such an air-tight system does not exist. When traps are broken during a storm, the rain has much more to say to it than the wind, as Pettenkofer long ago demonstrated in a simple model. If house, rain, and closet, &c., pipes open into a common subterranean drain with gentle gradient, then the rain pouring down the rain-pipe aspirates (like a Bunsen aspirator) great quantities of air which cannot flow with the water in the horizontal tube, if the street sewer be full, or a syphon exist between the house and street canal; hence a rupture of the water-traps. A picture representing this is given. Here, however, the sewer-gas would be greatly diluted. Further, if the water do not fill the whole cross section of the rain-pipe, the catastrophe does not happen. As illustrating the necessity of ventilation, we may mention a model of the author's. Three urinals, each with a trap, exist on each storey; these have a common drain-pipe, which opens at one on the second floor by a bell trap; a similar trap exists on the first floor, and in communication with the system. The model is flushed from the bell traps. The lower end of the common pipe becomes horizontal in the cellar, finally is vertical again. With abundant quantity of flushing water from second floor, and the use of water manometers, it is found that there is a considerable negative pressure in the upper syphons, whilst in those on the first floor there is a positive tension, which was so great, that the traps were broken. This result only happened when so much water was used, that the whole circle of the pipe was filled. The explanation is found in the slow velocity of the water flowing along the horizontally directed cellar pipe.

The author has made experiments on the pressure in tubes of varying position with varying velocity of water, and with a varying incline to the horizontal, and has represented the results in the form of curves, in which the horizontal line shows the velocity of the water, and the vertical the pressure. Increase of velocity of water goes with increase of pressure, and indeed tolerably uniformly in all positions of the pipes. The pressure is greatest in the horizontal tubes, the lowest pressure (actual negative tension) in the most inclined. The same statements hold for both narrow and wide pipes. Bad workmanship, the materials to be used for drains (there is no such word as 'plumber' in German, says our author), and ignorance or laziness in the use of even best made water-traps, are treated of.

IV. *Preventive Treatment.*—Renk does not accept the view, that fresh air in the sewer oxidises the gases and low organisms. Excess of air favours their development, as Erisman showed (tables given). We need have no fear in letting the offensive gases escape above the roofs, as Angus Smith pointed out that the air was hardly richer in CO_2 in such towns as Manchester, Birmingham, Glasgow, &c. than the air of meadows. A comparison between the amounts of CO_2 yielded respectively by the firing of a certain house, and by the excrements of the residents therein, is instituted, and it is seen that the amount in smoke is to the other as 100 to 2·3.

First Group: Water-Closets and Cesspits (Abfuhrtonnen).—The faults in the ventilation of such places are pointed out by aid of a neat diagram. Pettenkofer's principle of heating the upper part of the pipe ventilating the cesspit (*grube*) by means of a gas flame, has been in use for some time in the new buildings of the Hygienic Institute in Münich. Care must be taken to see that no heated surface is near, which has a temperature above that afforded by the gas flame, without seeing to the necessities involved in such an arrangement. Another method of ventilation is to use the heat of the kitchen flue; this has been done in some new houses at Münich, and has the advantage of being cheap. A third manner of ventilation is to have a conduit leading from the cesspit to the fireplace or kitchen chimney, and so the air of the pit is aspirated up the chimney with the gases from the fire; this has the disadvantage of possibly not always having sufficient difference of temperature; hence bad smells may arise. Gas is dear, and Pettenkofer has succeeded in producing a petroleum lamp which, too, is not easily extinguished. This lamp consists of a chamber holding the day's supply, on which sits a flat burner without cylinder. This flame is easily blown out; so the lamp should be put in a round lantern, through the bottom of which air can enter, and escape again at the top. This lamp is inserted into the drain-pipe, and requires daily attention. The wind is next discussed, as a mode of keeping the cesspits pure, and the 'Wolpert' cowl considered not to possess any advantage over a simple opening, unless to protect from shifting wind, as has been proved at Kew.

Second Group: (Water) Traps—The importance of ventilation of all the drain-pipes, and of preserving the width of the conduits throughout in preventing any catastrophe with the traps, is demonstrated with the aid of sketches of models. England and America have shown the insufficiency of the extension of the drain-pipe above the house-top to maintain the traps; hence the introduction of leaden pipes ventilating each trap. Our author sees objections to leaden pipes, apart from their dearness. 1. They are easily destroyed, as Fergus (*The Sewage Question, Glasgow*, p. 19) showed, by external damage, and this where the fracture cannot be seen; hence escapage into house may arise. 2. In Germany, all these arrangements are done in earthenware or iron, materials which are at least as lasting as lead. True, there are technical difficulties in the construction of joints, &c., but these exist in lead pipes as well. A scheme of house-drainage is given, which, the author holds, is very simple, and prevents any escape of gases into the house; in its simplicity, contrasting with English and American systems. Thus, a gently sloping sewer under the house collects from all the pipes in and about the house, and opens into the street sewer. The house-drain, of equal width throughout, opens above the roof, its branches (inside the house, of which there should not be too many) are provided at their endings with traps which must possess some contrivance for preserving the traps against the *syphon effect* which is brought into action, when, from some cause, the pipe joining the trap to the vertical house-drain is full of water, and so can act in the manner of a syphon. By this means it is believed that the trap can be broken. Renk advises a narrowing of

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some part of the syphon to hinder such a disaster. Any method which averts the filling of the pipes would answer as well. It is only under some circumstances that such a contingency would arise, as *e.g.* when an excessive quantity of water is used for flushing, or when the velocity of the water entering greatly exceeds the rapidity with which it escapes down the house-drain.

Rain-pipes frequently open directly under the window of the upper storey, in which case these rooms are in danger from entrance of sewer-air. The English contrivance of cutting the pipe short over a grating which is provided with a trap is recommended. A sketch of a trap is given, which cannot be destroyed, because the proportion between the 'peripheral' and 'central' limb is so great (as Renk explained above). The English and American practice of a special apparatus for the supply of fresh air to the drains is deprecated.

Many houses built at a great expense have defects in their drainage. Can such be repaired without necessitating altogether new arrangements? Very much can be done by narrowing the peripheral opening of syphons, which prevents—(1) the emptying of the trap from the syphon action; (2) the complete filling of the drain-pipe; and consequently (3) the emptying of the traps in the storey above, and (4) the destruction of the same below. Another way out of the difficulty would be to use a Pettenkofer's ventilator, of which drawings are given. This ventilator is an air-tight iron cylindrical box, eight centimètres diameter and six centimètres high; the floor and the roof are pierced by a two-centimètre pipe, which overlap one another one centimètre in the interior, so that the opening of the upper (air pipe) lies one centimètre deeper than the upper end of the lower pipe, which opens into the drain just at the second bend of the syphon. Water is poured in by the upper pipe, and so a trap created one centimètre high. The state of this ventilator with negative and positive pressure in the drain is entered upon, and the faculty of hindering the syphon trap from being broken demonstrated. This ventilator requires to be systematically attended to, and so, where this is not possible or likely, the author suggests a new apparatus of his own, which consists, in its simplest form, of a basin, on the deepest part of which a grate lies, by which the water enters an underlying box, through the lower of which chamber the drain-pipe passes and opens six centimètres above the floor. Under the grate a horizontal partition exists, which is pierced by two pipes which open five centimètres lower than the opening of the drain-pipe. The water flows through the two pipes, and creates a trap five centimètres high. This arrangement may be used for cases where the water is not impure, as spring troughs, baths, and also for urinals. It is not suitable for kitchen and other purposes, as fat would accumulate on the sides of the chamber and pipes, and to destroy its efficacy. For such purposes, a modification is given, which is of larger size, and allows a thorough cleaning out. These contrivances have been used for three-quarters of a year with good result. A similar kind of thing may be appropriated for baths and water cisterns where an escape of sewer gas is possible. Sketches of all these apparatus are given, and seem intelligible.

V. *Ventilation of Sewers.*—Under this heading comes the subject of the direction and strength of the draught in the sewers which Fôszahegyi, Lissauer, Soyka, have lately worked at. As a main factor in the causation of movement of air in sewers, Renk follows Lindley in believing that the difference of temperature of air in houses and in the atmosphere occupies that place. The view of Rôszahegyi that flowing water has a great power of causing a flow of air in the same direction, and that this factor plays an important part in the direction of the draught in sewers, is not followed. Moreover, the cross section of the main sewer is less than the joint cross sections of all the peripheral sewers; this would rather lead to a damming back of air, our author thinks. He further found an upward current in Frankfurt in the month of November.

CORRESPONDENCE.

[All Communications must bear the signature of the writer, not necessarily for publication.]

'FRESH FIELDS AND PASTURES NEW.'

Will you allow me through the medium of your paper to draw attention to the Forest of Dean, in Gloucestershire, as a good place for holiday resort, and also for retirement for those seeking to settle in a quiet, healthy, country spot; the scenery is of a truly beautiful and variegated character, which no one could fail to appreciate. I would especially recommend to the notice of the latter class the town of Mitcheldean, on the borders of the forest. It is situated at an altitude of about 500 feet above sea level, which causes a naturally perfect drainage, the air to be light and bracing, dry, and free from fogs; while its being bounded on the north and east sides by hills protects it in a great measure from storms, cold, &c.; and I am informed by a medical friend in the neighbourhood that consumption and all lung diseases are almost unknown here. A plentiful supply of excellent water, the comparative lowness of rates, exceeding cheapness of provisions, productiveness of the soil and fruitfulness of the country generally, all combine to make the locality a most desirable one in which to reside. Being a small country town of about 1,000 inhabitants, dwelling-houses for disposal are consequently scarce, although hotel accommodation for holiday-seekers is good, cheap, and private. The principal landowner in the neighbourhood has, however, expressed his willingness to sell or lease any land for building purposes from any part of his extensive property; this is a great advantage, and persons desirous of settling in this neighbourhood may select their own site, and build to their own taste. The land is cheap, and brick, stone, and timber are also inexpensive and plentiful. The town is 1¼ mile from Mitcheldean Road Station on the Great Western Railway, but a new branch connecting line is in contemplation, and will probably be shortly carried out. I came here accidentally myself a few years ago, and at once resolved to settle, chiefly on account of my wife, who was then in consumption (from which she has since recovered), and have since been so impressed with the neighbourhood and its advantages that I desire to make its existence as widely known as possible, so that others may share its enjoyment, and should be pleased to assist any inquirers with needful information, &c.

I shall esteem it a favour if you will give this letter publication, as I am convinced that the Forest of Dean only requires to be known to be appreciated at its true value.

ALFRED SMITH.

Tusculum,
Mitcheldean.
July 19, 1883.

THE DISSEMINATION OF DISEASE BY MILK.

SINCE it has been shown that milk may be the means of disseminating various forms of septic disease, it appears to me it is now often blamed very wrongly and without sufficient reason. As is well known, there are two ways in which poison may be conveyed in milk, viz., through disease in the cow, and through its being introduced subsequent to milking, which latter is, in my opinion, by far the more frequent. It was at one time supposed that cattle feeding on sewage grass could convey enteric fever, but this is now, I believe, entirely discredited. Again, it was asserted that foot and mouth disease could convey diphtheria to the human being, but this, again, has gone the way of a good many hastily formed theories. As to what diseases are actually conveyed through the milk of diseased cows seems altogether uncertain. We are by no means sure that this can originate from the milk of tuberculous cows, and the Scotch correspondent to the *Lancet* of March 3 says with regard to foot and mouth dis-

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ease, 'The teaching of the veterinary profession seems to be that if the vesicles which are conspicuous in the mouth and betwixt the hoofs are also found on the teats or their lining membrane, the milk may be deleterious, though few cases have been recorded.' Now, considering that foot and mouth disease has so long and so extensively prevailed in this country, we ought to be no longer in doubt as to whether the milk of cows so affected is injurious or not, or as to what disease, if any, is conveyed by it. That we are still in doubt speaks badly for our observation and research, and it is to be hoped that the committee which was appointed about two years ago will be able to enlighten us on this and other matters. About four or five years ago I noticed that a cow-keeper at Lincoln was fined 5*l.* for having six cows in his possession affected with foot and mouth disease, and supplying milk from these cows to the workhouse. Now here at least was a good opportunity of ascertaining from the medical officer whether any disease was conveyed to the inmates, and if there was, its particular nature.

With regard to septic poisoning subsequent to milking, I think we have more clear knowledge, and are able to prove beyond all doubt that scarlatina, enteric fever, cholera, and diphtheria may be produced, one or the other, according to the particular germs absorbed. But now and then it happens that though the cows, the sheds, the dairies, the employés, the water used for cleansing purposes, &c., are all in a perfectly satisfactory condition, the milk is blamed, because a large or the larger proportion of those affected are taking a particular milk-supply. An instance of this kind occurred only a short time ago. There was an epidemic of follicular tonsillitis, and almost all the cases first attacked were supplied by one dairy (the only large one in the district). The cows, the sheds, the dairies, the pans, the employés, the water, &c., were all examined and nothing wrong could be detected with either. Subsequently it was noticed that cases arose in connection with almost every milk-supply in the place, and that children under five, the great milk drinkers, were not affected at all, and the chief sufferers were servants. The weather at the time was unusually wet, and from recognising the fact that the young children live most at the top part of the house, which is usually dry, and the servants in the basements, which, at the time, were unusually damp, owing to the long-continued rain, and that it broke out at a time when influenza was prevailing, that it was accompanied with intense frontal headache, pains in the limbs, and in some cases with herpes, it is natural to suppose that it was in great measure caused by fog, absence of sunlight, saturation of the atmosphere, and general dampness of the basements. Another thing against the milk theory was that many of those affected took during their illness a larger quantity of milk than usual, and yet were convalescent in about forty-eight hours, and also that the same disease was prevalent in various parts of the country, especially the low-lying districts. I cannot help thinking we should be particularly careful not to single out any tradesman, or article of food, as being at fault, until we are quite certain that the facts accumulated clearly justify us in taking action, for the damage and loss occasioned by such a step is often irremediable.

I am, Sir, your obedient servant,

Surbiton, July 1883. F. F. ATKINSON, M.D.

THE INFLUENCE OF STORMS UPON WATER-TRAPS.

I AM pleased to find that Mr. Buchan in his letter upon the above subject in your July number, goes so far as to believe that the closet-trap as shown by my diagram No. 2, might under certain conditions be forced. He, therefore, admits that the principle which I endeavoured to describe in my paper and letter in previous numbers of the SANITARY RECORD, is correct. Mr. Buchan and myself agree so far, but we are at issue upon the size of air-pipe only. It has taken plumbers about thirty years to be convinced that the extension of a soil-pipe should be the same size as the soil-pipe itself, and possibly it will take them another thirty years before they are convinced that a closet-trap above a trapped drain, and in connection with an unventilated sewer, might be forced, if it has a soil-pipe extension of much less capacity than the soil-pipe. In the meantime I shall go on using extensions (which I have named Anti-vacuum pipes) of the same capacity as soil or waste-pipes, whether my diagram misleads or not.

August 1, 1883. HENRY MASTERS.

PARKS AND OPEN SPACES.

DISUSED CHURCHYARDS AS RECREATION GROUNDS.—The Paddington Vestry, at its last meeting, agreed to convert the disused churchyard of St. Mary, Paddington Green, which is upwards of three acres in extent and well timbered, into a pleasant place for sober recreative purposes. Flower beds are to be formed, railings neat in appearance substituted for unsightly walls, falling and neglected head stones laid flat, and where necessary defective vaults and graves amended. The improvement, which is much needed, will cost about 1,400*l.*——The Kyrle Society have offered to 'lay out' the churchyard of St. Peter's, Hackney Road, the area of which is about half an acre, as a recreation ground for the use of the adult public.——The disused churchyard of St. Leonard's, Shoreditch, has just been thrown open as a recreation ground for the people, many hundreds of children especially availing themselves of the opportunity of using it as a playground.

The Duke and Duchess of Connaught have opened a new park at Dover. The park consists of a considerable tract of land, about half-way up the Castle Hill, and is very tastefully laid out in smooth lawns and terraces. Not the least of its attractions is the fine view it affords of the sea, the castle, the heights, and the whole town of Dover. It is leased at a nominal rent by the Corporation from the Woods and Forests; and the townspeople, therefore, though the work of planting and landscape gardening cost nearly 3,000*l.*, may congratulate themselves on having made a great improvement at a comparatively small cost.

At a recent meeting of the Newton (Devon) Local Board, a letter was read from the agent of the Earl of Devon offering to lease a portion of the Newton Marsh for the purpose of forming a recreation ground for a term of fourteen years, at a nominal rent of 5*l.* a year. The ground measures about 2a. 2r. 32p., and the Board decided to accept the offer.

COMPETITIONS.

NEW HOSPITAL AT ROME.

A COMPETITION has been opened at Rome for plans of a suitable kind for a new hospital. According to an official notice issued by Signor Bacelli, the plans are to include the necessary administrative offices, a medico-chirurgical hospital of 450 to 500 beds, and a number of special departments for various classes of diseases. The hospital and polyclinical branches are to be constructed on the pavilion system, with buildings one story high. The separate wards are not to contain more than sixteen to eighteen beds. In sending designs, architects have to furnish a general plan on the scale of 1 to 400. The plans of all the buildings are to be on the scale of 1 to 200. A principal view of the entire work is also required on the scale of 1 to 200, and the most important portions of the separate buildings are to be shown upon the scale of 1 to 100. An explanatory report is to be appended, and an estimate is to be furnished, showing that the entire work will not cost more to execute than eight million lire

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(320,000*l.*). The designs have to be sent in anonymously (but provided with mottoes) by October 11. Fourteen days previously to that time the receipt of plans will commence at the Municipal Chancellor's Office in Rome. The selection will be intrusted to a committee named by the Minister of Public Instruction, and consisting of architects as well as physicians. The best design will receive a premium of 400*l.*, and the two next best ones 200*l.* each. The Government acquires the property of the prize designs, but retains complete liberty as to the choice of the one to be carried out. The necessary details are sent to intending competitors by the Building Office at Rome (*Elidizia di Roma*).

CONGRESSES.

INTERNATIONAL VETERINARY CONGRESS.

THE Council of the Royal College of Veterinary Surgeons have deputed its president, Mr. George Fleming, LL.D., Principal Veterinary Surgeon to the Army, to represent the veterinary profession at the International Veterinary Congress that meets at Brussels early in September, and at which very important questions relative to professional instruction and the public health in regard to tuberculosis and other animal diseases are to be discussed. This congress will be attended by the leading veterinary authorities in Europe and America.

NOTICES OF MEETINGS.

SANITARY INSTITUTE OF GREAT BRITAIN.

AT the anniversary meeting, held at the Royal Institution on Thursday, July 12, Prof. G. M. Humphry, M.D., F.R.S., Vice-President of the Institute, in the chair, an address was delivered by W. Eassie, C.E., F.L.S., F.G.S., entitled 'The Relationship between Geology and Sanitation' (published at page 51), and the medals and certificates were presented to the successful exhibitors at the Exhibition held at Newcastle in September 1882. At the close of the address the chairman proposed a vote of thanks to W. Eassie, C.E., F.L.S., F.G.S., which was seconded by Dr. Alfred Carpenter. A vote of thanks to Prof. G. M. Humphry for presiding was moved by Captain Douglas Galton, F.R.S., and seconded by G. J. Symons, F.R.S.

SANITARY JOTTINGS.

SANITARY.

The Industrial Dwellings Company, of which Sir Sydney Waterlow, M.P., is chairman, has acquired from the Metropolitan Board of Works over an acre of land in Soho, having frontages to the new street from Charing Cross to Oxford Street, on which nearly 1,000 rooms will be erected.

Newcastle-on-Tyne has recently exhibited an excessive death-rate, being higher than most of the twenty-eight large towns for the week ending August 4: the average was thirty-three in the 1,000. The sanitary authorities are exercising the utmost vigilance in removing everything detrimental to the public health: the sewers being constantly and thoroughly disinfected.

LOCAL.

The Corporation and Urban Sanitary Authority of Newark-upon-Trent have raised the salary of Mr. George Sheppard, their surveyor, from 80*l.* to 150*l.* per annum.

The Worksop Local Board and Urban Sanitary Authority have raised the salary of Mr. John Allsopp, their surveyor, from 150*l.* to 200*l.* per annum, conditionally upon his relinquishing private practice.

APPOINTMENTS UNDER THE PUBLIC HEALTH ACT.

MEDICAL OFFICERS OF HEALTH.

ADKINS, George, L.R.C.P.Lond., M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Plympton St. Mary Rural Sanitary District, Devonshire, at £150 for one year, *vice* the Poor-law District Medical Officers, whose appointments have expired.

APPLEBE, Edward Alexander, L.R.C.P.Edin. and L.M., L.F.P.S. Glasg., has been re-appointed Medical Officer of Health for the Hay Urban Sanitary District, at £10 for one year.

ARTHUR, James, L.R.C.P.Edin., L.R.C.S.Edin., has been appointed Medical Officer of Health for the Easington Rural Sanitary District, at £120 per annum for three years, *vice* Rawlings, whose appointment has expired.

BENCRAFT, Henry, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Southampton Port Sanitary District, at the rate of £52 10*s.* per annum, till Lady Day 1884.

DANIEL, Woodruffe, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Wareham Urban Sanitary District, at £10 for the year ending June 24, 1884.

DOMENICHETTI, Richard, M.D., Deputy Inspector-General, Army, H.P., has been re-appointed Medical Officer of Health for the combined Louth Rural and Urban Sanitary Districts, at £330 per annum for five years.

ELLIS, William Henry, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Shipley Urban Sanitary District, at £60 per annum for three years, *vice* Smyth, whose appointment has expired.

FISHER, Thomas, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Garstang Rural Sanitary District, at £50 for one year.

HASWELL, Narcis Richard, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Helston Rural Sanitary District, Cornwall, at £100 for the year ending March 25, 1884, vice the Poor-Law District Medical Officers, whose appointments have expired.

HAYMAN, Henry, F.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the No. 1 sub-district of the Wycombe Rural Sanitary District, at £40 for one year.

HIME, Thomas Whiteside, M.B.Univ.Dub., L.R.C.S.Edin., has been appointed Medical Officer of Health for the Bradford, Yorkshire, Urban Sanitary District, at £500 per annum for five years, *vice* Butterfield, resigned.

HOPE, Edward William, M.D.Edin., L.R.C.P.Lond., has been appointed Assistant Medical Officer of Health for the Liverpool Urban Sanitary District.

HOSEGOOD, William, M.B.C.M.Univ.Edin., has been appointed Medical Officer of Health for the Amersham Rural Sanitary District, at £50 for one year, *vice* Brickwell, resigned.

ILOTT, Edward, F.R.C.S.Eng., L.R.C.P.Lond., L.S.A.Lond., has been appointed Medical Officer of Health for the Bromley, Kent, Urban Sanitary District, at £10 for one year.

MALET, Henry, M.D.Univ.Dub., has been appointed Medical Officer of Health for the Wolverhampton Urban Sanitary District, at £150 per annum, *vice* Love, resigned.

PHILPOT, Charles William, M.D.Univ.Lond., has been appointed Medical Officer of Health for the Croydon Urban Sanitary District, at £200 per annum.

SMYTH, Hatton, M.D., C.M.Trin. Coll. Dub., Lic.Mid., K.Q.C.P. Irel., has been appointed Medical Officer of Health for the Poole Rural Sanitary District, at £70 per annum for five years, from Sept. 29 next, *vice* Montgomery and Lawson.

VERDON, Henry Walter, F.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Parish of St. Mary, Lambeth, at £300 per annum, *vice* Groves, resigned.

WALFORD, Edward, M.R.C.S.Eng., L.S.A.Lond., S.Sc.Cert.Cantab., has been re-appointed Medical Officer of Health for the Ramsgate Urban Sanitary District, at £150 per annum for three years.

WARREN, Thomas, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the No. 2 sub-district of the Wycombe Rural Sanitary District, at £35 for one year.

WILLS, Mr. Charles, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Mansfield Urban, and the Worksop and Southwell Rural, Sanitary Districts, combined, at £400 per annum, for three years.

SURVEYORS, CLERKS TO GUARDIANS, INSPECTORS OF NUISANCES, &C.

BARKER. Mr. W. F., has been re-appointed an Inspector of Nuisances for the Blackrod Urban Sanitary district, Lancashire.

BARNES, Mr. Henry FitzJames, has been appointed Inspector of Nuisances for the Poole Rural Sanitary District, at £70 per annum for five years, from Sept. 29 next, *vice* Barnes and Crumpler.

BROWN, Mr. Edwin, has been re-appointed Inspector of Nuisances for the Burgess Hill Urban Sanitary District, Sussex, at £30 per annum for three years.

CHASEMORE, Mr. Henry, Union Bank, Croydon, has been appointed Treasurer to the Corporation and Urban Sanitary Authority of Croydon.

CLAYPON, Mr. W. L., Banker, has been appointed Treasurer to the Spalding Guardians and Rural Sanitary Authority, *vice* Garfit, deceased.

CLEVERTON, Mr. Frederick William, has been appointed Clerk to the Plympton St. Mary Guardians and Rural Sanitary Authority, at £90 per annum as Clerk to the Guardians, £35 per annum as

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Clerk to the Rural Sanitary Authority, such further remuneration as Clerk to the Assessment and School Attendance Committees as may be annually fixed, and fees as Returning Officer; also Clerk to the St. Germans Guardians and Rural Sanitary Authority, at £70 per annum as Clerk to the Guardians, such further remuneration as may be from time to time fixed as Clerk to the Rural Sanitary Authority, to the Assessment Committee, and to the School Attendance Committee, and fees as Returning Officer, *vice* Mr. F. W. P. Cleverton, deceased.

COOKE, Mr. Frederick Boulter, has been appointed Treasurer to the Hay Local Board and Urban Sanitary Authority, and to the Hay Guardians and Rural Sanitary Authority, *vice* Trotter, resigned.

COX, Mr. Thomas Mitchell, has been re-appointed Inspector of Nuisances for the Southampton Port Sanitary District till Lady Day 1884.

DERBY, Mr. Jacob, has been elected a member of the Bingley Local Board and Urban Sanitary Authority, *vice* Whitley, deceased.

DICKENSON, Mr. William, has been appointed Inspector of Nuisances for the combined Saffron Walden Rural and Urban Sanitary Districts, at £130 per annum, *vice* Blackmore, resigned.

EAGER, Mr. Edward, has been elected a Member of the Hove Board of Improvement Commissioners and Urban Sanitary Authority, *vice* Viner, resigned.

EMMETT, Mr. J. W., one of the retiring Members of the Newton Board of Improvement Commissioners and Urban Sanitary Authority, has been re-elected for the ensuing three years.

FISHBOURNE, The Rev. George William, has been elected a Member of the Bognor Local Board and Urban Sanitary Authority, *vice* Conder, resigned.

FORDOM, Mr. John Pope, has been re-appointed Inspector of Nuisances for the Wycombe Rural Sanitary District, at £110 per annum for two years.

FORSTER, Mr. T., one of the retiring Members of the Newton Board of Improvement Commissioners and Urban Sanitary Authority, has been re-elected for the ensuing three years.

FOX, Mr. Ambrose, has been re-appointed Inspector of Nuisances for the Garstang Rural Sanitary District, at £44 for one year.

GLOVER, Mr. B. B., one of the retiring Members of the Newton Board of Improvement Commissioners and Urban Sanitary Authority, has been re-elected for the ensuing three years.

GOOCH, Mr. W. F., one of the retiring Members of the Newton Board of Improvement Commissioners and Urban Sanitary Authority, has been re-elected for the ensuing three years.

GREEN, Mr. Charles Law, has been appointed Surveyor and Inspector of Nuisances to the Nuneaton Local Board and Urban Sanitary Authority, at 150*l.* per annum, *vice* Maclese.

GREGORY, Mr. J., has been elected a Member of the Ilkeston Local Board and Urban Sanitary Authority, Derbyshire, *vice* Thomas, deceased.

HANN, Mr. John, has been appointed Treasurer to the Morpeth Guardians and Rural Sanitary Authority, *vice* Wilkinson, deceased.

HANDLEY, Mr. Edward Thomas, has been re-appointed Inspector of Nuisances for the Sedgley Urban Sanitary District, at £70 for one year.

HERRING, Mr. John C., the Clerk to the Sutton Local Board and Urban Sanitary Authority, has been appointed also Collector.

HIBBERT, Mr. Thomas, jun., has been appointed an Inspector of Nuisances for the Blackrod Urban Sanitary district.

HINGSTON, Mr. Frederick, has been appointed Treasurer to the Cardiff Guardians and Rural Sanitary Authority, *vice* Woods, resigned.

HOLROYD, Mr. Alfred, has been re-appointed Inspector of Nuisances for the Cleckheaton Urban Sanitary District, at £30 per annum.

HUGHES, Mr. Walter, has been elected a Member of the Bognor Local Board and Urban Sanitary Authority, *vice* Jenkins, resigned.

KING, Mr. C., has been elected a Member of the Horsham Local Board and Urban Sanitary Authority, *vice* Pennells, resigned.

KNIGHTS, Mr. James West, has been re-appointed Public Analyst for Huntingdonshire, for one year.

MAKEPEACE, Mr. John B., has been appointed Inspector of Nuisances for the Felling Urban Sanitary District, at £80 per annum, *vice* Osselton, resigned.

MITCHELL, Mr. Edward, has been appointed Chief Sanitary Inspector for the Croydon Urban Sanitary District, at £175 per annum.

MOORE, Mr. Edward Henry, has been re-appointed Public Analyst for the County of Sussex, for one year.

MORRIS, Mr. Charles Thomas, has been re-appointed Collector to the Corporation and Urban Sanitary Authority of Welshpool, at 2½ per cent. commission and £25 per annum as School Attendance Officer.

NANKIVELL, Mr. W. H., has been re-appointed Surveyor and Inspector of Nuisances to the East Dereham Local Board and Urban Sanitary Authority, at £25 and £50, for the ensuing year.

POTTER, Mr. John, has been appointed Surveyor and Inspector of Nuisances to the Corporation and Urban Sanitary Authority of Welshpool, at £120 per annum, *vice* Hurst and Fortune, whose appointments have expired.

SAUNDERS, Mr. James, has been re-appointed Clerk to the East Dereham Local Board and Urban Sanitary Authority for the ensuing year.

SCHOFIELD, Mr. R. Henry, has been appointed Clerk, Surveyor, and Collector, to the Blackrod Urban Sanitary district, *vice* Potter and Saunders.

SIDNEY, Mr. Marlow William, Solicitor, has been appointed Clerk to the Cowpen Local Board and Urban Sanitary Authority, Northumberland, at 50*l.* per annum, *vice* Robinson, resigned.

[illegible], Mr. Henry, has been appointed Treasurer to the Corporation and Urban Sanitary Authority of Dartmouth, *vice* Eales, resigned.

STANTON, Mr. Walter, has been appointed Surveyor to the Corporation and Urban Sanitary Authority of Chesterfield, at 125*l.* per annum, *vice* Tuley, resigned.

TUCK, Mr. Arthur William, has been appointed Clerk to the Oakham Guardians and Rural Sanitary Authority, at £80 per annum as Clerk to the Guardians, £50 per annum as Clerk to the Rural Sanitary Authority, £20 per annum as Clerk to the Assessment Committee, £15 per annum as Clerk to the School Attendance Committee, and £12 per annum as Returning Officer, *vice* Hough, resigned.

WALKER, Mr. Thomas, has been appointed Surveyor to the Corporation and Urban Sanitary Authority of Croydon, at £500 per annum.

WANKLYN, Mr. James Alfred, has been re-appointed Public Analyst for Peterborough, for two years.

WHITEHEAD, Mr. James, jun., has been appointed Inspector of Nuisances and of Gas and Water Meters for the Rawmarsh Urban Sanitary District, Yorkshire, at £80 per annum, *vice* Train, resigned.

WRIGHT, Mr. John William, has been appointed Inspector of Nuisances for the Bingham Rural Sanitary District, at £70 per annum, *vice* Arnsby, deceased.

NOTES AND QUERIES.

Having for some time back been in the receipt of Queries appertaining strictly to sanitary work, and which it would be easy to answer without having to refer our correspondent to competent professional advisers, we have opened a column in which to register such Queries and Replies thereto as can fairly be expected from us; and our subscribers and readers are invited to make such use of this column as will tend to benefit themselves and the community. Both Queries and Replies will, however, be subjected, if unnecessarily long, to a strict curtailment.

99. WATER SPOUTS TO HOUSES.

How may the provision of these be insisted upon in rural districts?

VICAR.

[Only by obtaining for the particular place in question urban powers, and then only as regards new buildings, the construction of which can be regulated by by-laws. One of the by-laws of the model series IV., issued by the Local Government Board, provides that 'every person who shall erect a new building shall cause the roof or flat of such building to be constructed that all water falling on such roof or flat shall be received in suitable gutters, shoots, or troughs'; and a second by-law provides for a 'suitable pipe or trunk extending from the roof of such building to the ground, to be fixed to the front or rear, or to one of the sides of such building, and to be so connected with a gutter, shoot, or trough receiving any water that may fall on the roof, as to carry all such water therefrom without causing dampness in any part of any wall or foundation of such building.' As regards urban districts, by-laws for this purpose are rendered to a large extent unnecessary by Section 74 of the Towns Improvement Clauses Act, 1847 (10 & 11 Vict. cap. 34), which makes the provision of water-spouts compulsory under a penalty of forty shillings a day, where an order for such provision has been made on the owner or occupier by the local authority.]

100. DUST-BINS.

Is there specific power under the Public Health Act to compel an owner to provide dust-bins? I am of course aware of the various sections relating to ash-pits, but it appears to me that the 'ash-pit' contemplated by the Act is a part of a privy.

X.

[The word 'dust-bin' does not occur in the Public Health Act or in the Model By-Laws of the Local Government Board: but it is covered by the word 'ash-pit.' Observe that Sect. 36 of the Public Health Act requires that upon notice by the local authority the owner or occupier of a house must provide 'a sufficient water-closet, earth-closet, *or* privy (these being alternate methods of doing the same thing—*i.e.* disposing of the excrement), *and* an ash-pit furnished with proper doors and coverings (evidently for a different purpose altogether—viz., the removal of refuse).]—ED.

101. COMPULSORY REMOVAL TO HOSPITAL.

What interpretation of the words 'without proper lodging or accommodation,' in Section 124 of the Public Health Act, do legal precedents justify?

X.

[This is a question of much nicety. So far as we are aware, no legal decision on the subject has been actually made; but it was the opinion of the late Mr. Lumley, the Counsel of the Local Government Board, that the words referred to meant 'lodging and accommodation' proper for the patient himself, and not for those surrounding him. In other words, so long as the patient can be treated without danger to himself, the law can take no cognisance (*qua* compulsory notification) of the danger of catching the disease incurred by those surrounding him. This view, if it be the correct one, which is open to argument, is a most unfortunate one from the public health stand-point. For arguments against such a reading of the words, see the successive reports on Local Legislation of the Chairman of the Parliamentary Bills Committee of the British Medical Association, especially that for 1881. See also SANITARY RECORD, vol. xii., p. 92.]

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ORIGINAL PAPERS.

RICHMOND AND ITS WATER SUPPLY.

By G. PHILLIPS BEVAN, F.G.S., F.S.S.

FEW localities have obtained so much notoriety of late as Richmond, though of a kind of which it has little reason to be proud, seeing that the cause of it has been as complete a breakdown of the water arrangements as can well be imagined. Not only is the case itself instructive, but Richmond has for so long been the cynosure of every eye and the familiar dream of Londoners, that the situation is emphasised, and the attention of the public drawn to it more than if it were a less noteworthy place. The fact is that Richmond's attractions have to a certain extent been a drawback, inasmuch as it was, until the last fifteen or twenty years, a comparatively rural village, which repudiated all association with London, and held itself aloof with a lordly air. In so doing Richmond was to a large extent justified, from the beauty of its surroundings, its lovely situation, its aristocratic neighbourhood, and its acknowledged salubrity; and in truth, a prettier and pleasanter spot could not have been found within a day's journey from the metropolis. As far as these advantages were concerned, it was an evil day for Richmond when it was discovered that the London and South-Western Railway was not sufficient for the needs of the inhabitants, and that it was advisable, therefore, to bring to its doors the District Extension Line, by which speedy access was to be given to the City viâ King's Cross on the north, and Charing Cross on the south, a consummation which was rapidly followed by the North London and the Ludgate Hill services, with the result that at the present time there are some three hundred trains a day to different points in the metropolis and suburbs. The natural consequences followed. Whereas Richmond was formerly the residential resort of the comparatively few, whose well-to-do and comfortable houses had been a feature for a hundred years or more, it now became the resort of business men, simultaneously with whom appeared the speculative builder, with his suburban villa erections. The effects were practically shown in the Census returns, in which Richmond is thus described.

	1861	1871	1881	Increase since 1861.
1. Urban sanitary district—				
Inhabited houses...	1,246	2,566	3,448	2,202
Population	7,423	15,113	19,068	11,645
2. Superintendent Registrar's district (area 4,983 acres)—				
Inhabited houses...		4,483	6,034	
Population		26,145	33,630	
3. Registrar's sub-district (area 2,160 acres)—				
Inhabited houses...		2,850	3,845	
Population		16,829	21,301	

Rateable value in 1877–78, 117,921*l.*; 1878–79, 122,046*l.*; 1879–80, 127,049*l.*; 1880–81, 134,629*l.*; 1881–82, 142,969*l*; 1882–83, 155,019*l.*

Richmond is also alluded to in Mr. De Rance's able work on 'The Water Supply of England, 1881.' 'Population, 19,068, supplied at present by a temporary well made by urban authority, after the supply to the town, formerly given by the Southwark and Vauxhall Company, without Parliamentary authority, was cut off by that company, Jan. 14, 1877. Supply, 475,016 gallons—intermittent. Artesian well in progress: has now reached the chalk. Reservoir in Richmond Park holding 750,000 gallons. Public Health Act, &c.'

Whether we take the urban sanitary district or the registrar's sub-district (which, perhaps, would be most proper), the increase of both houses and population is very striking, particularly when we remember that there is absolutely no trade or manufacture to cause any such increase. During the last ten years building in Richmond has multiplied exceedingly, by no means to its improvement or comfort. Many a fair field has been enclosed, and many a noble tree felled, their place knowing them no more, but filled up with rows of monotonous villas. Fortunately, the exquisite Richmond Park cannot be touched, though the hill-side sloping away from it on the north and towards the railway station has become so covered with houses that there is scarcely room for more. All this once open ground is now occupied by Cardigan, Montagu, Onslow, Church, Ararat, and King's Roads, with their connecting cross streets, most of them filled with houses of from £80 to £150 rentals, while little colonies of new 'estates,' such as the Halford, Larkfield, Sheen Park, King's Farm, &c., have sprung up like mushrooms in the lower parts of the town. Further north, again, the open country between Richmond and Kew has been equally built upon, practically joining the two places. On the Selwyn Estate are many very good houses, though the same cannot be said of Sandy Lane (alongside the District Line), which, always more or less neglected by the parish, has lately been increased by a long row of cottages, one portion of it built on the site of a refuse heap. The poorer section of the community is chiefly found in what is known as New Richmond, where a considerable population is clustered around the gas-works on the outskirts of the parish.

Up to the commencement of the year 1877, Richmond was amply supplied with water by the Southwark and Vauxhall Company, the population of the town being then about 17,000. The Vestry considered that the price of the water was too high, and made an effort to contract with the company at a lower rate. This the company declined to do, and the disagreement gradually became a quarrel, giving rise to a good deal of ill-feeling. The negotiations were finally broken off by the Vestry determining to become their own water purveyors, on which occasion the following letter was circulated amongst the ratepayers:—

'Vestry Clerk's Office,
'Richmond, Surrey, December 28, 1876.
'Richmond Water Supply.

'Sir,—You are doubtless aware that the Vestry have received notice from the engineer of the Southwark and Vauxhall Water Company that the company will, on January 13 next, cease the water-supply to the town, unless they receive "compensation" from the Vestry for continuing the supply.

'I am directed by the Committee of the Richmond Vestry (to whom this notice has been referred) to inform you that although the new artesian well at the parish water-works is not yet completed, the Committee has made arrangements to furnish from their existing artesian well, and other equally good sources, *an ample supply of pure water* to the inhabitants.

'The Committee have agreed to recommend the Vestry to commence the supply on the following exceedingly moderate terms:—

'1. The rate of charge on private houses an

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shops to be *sixpence* in the pound per annum on the rateable value (instead of *one shilling* in the pound and upwards per annum on the gross value, which you now pay); no extra charge to be made for baths, water-closets, or high service, nor for empty houses.

'2. Breweries, dye-works, laundries, and the like, to be supplied by water at a rate not exceeding *sixpence* per 1,000 gallons, or by special agreement with the Vestry.

'3. The water rate to be collected quarterly (together with the poor and highway rates), and not in advance.

'4. The Vestry to make the necessary change from the Southwark Company's mains to their own, without expense to you, and with as little delay as possible.

'As it is important that the Committee should be immediately informed whether you desire to take your future supply from the Vestry, I enclose a form for your signature, which I beg you will return to me on or before Monday, January 1 next, failing which, any delay in the change of your supply will not be the fault of the Committee.

'I am yours obediently,

'F. B. SENIOR,

'Vestry Clerk.'

As might be expected, the circular (and especially that part of it as to the reduction of the rate) was generally approved, the more so as the town was led to expect a speedy and plentiful supply from the new artesian well, which the Vestry believed would be ready in some six months' time. It is worth noting that the 'ample supply of pure water' to which the Vestry clerk so pointedly alludes, is said to have been obtained partly from the Leg of Mutton Pond, an open piece of water of very small size in Richmond Park; partly from the ditch running by the bottom of the cemetery—mere surface water, with a suspicion of cemetery drainage; and subsequently from the Petersham well. But that even then there was considerable dissatisfaction, may be gathered from the fact that a Local Government Board inquiry was held on the question in 1877, when Major Tulloch was present, and at which a committee of ratepayers appeared by counsel to protest against the supply by the Vestry of water from the Petersham well. This well was sunk in the Petersham meadows, and had the disadvantage then, as now, that the quality of the water yielded by the so-called springs was influenced by the state of the tide. All Richmond residents and all boating men know that when the tide is unusually high, the whole of the meadow is covered for several feet by tidal water, which must be plentifully saturated with sewage, as it is below the outfall of the sewers of Twickenham, Teddington, and other places. But from the time of the building of the well until the resumption of the water-supply by the Southwark and Vauxhall Company on August 28, 1883, a very considerable amount of the daily supply has been furnished to Richmond from this well, either by itself, or mixed with the better water from the artesian source. It is not to be wondered at that the Vestry have discountenanced any effort to obtain an analysis of this Petersham water, although a member of the recent deputation to Sir Charles Dilke on August 27 last produced a sample from his cistern, of which the presumptive evidence was in favour of its having been supplied either from the well or direct from the Thames. At any rate, its cloudiness was evident to the naked eye, while an ordinary magnifying glass revealed swarms of rotiferæ and other unpleasantnesses.

The history of the new artesian well sinking (which is being carried down within the old one) would probably be very curious and interesting reading, were it ever made public. The contract depth to which the bore-hole was to be taken, if required, was 1,143 feet, though it is said that the original estimate of what was necessary to obtain an abundant supply was 434 feet. However that might be, the well is now bored to the depth of 1,249 feet, 845 feet below the boring of the old well, and 136 feet below the extreme contract depth, and, what is more ominous still, according to the resident engineer, is still unfinished. Though nobody (and certainly not the Water Committee) knows in what strata the lowest boring is, there is no doubt but that the London clay and chalk have been sunk through, and it is believed that the Devonian rocks have now been reached, it being evident that there must be a considerable hiatus of the ordinary intervening beds. This seems probable by a comparison with the well sunk at Messrs. Meux's brewery in Tottenham Court Road, in which, below the chalk, 255 feet of greensand and gault were first reached, *and then*, the Devonian beds at 1,064 feet from the surface. It is quite possible that the greensand and gault have thinned out so as to practically be absent, as the present termination of the boring is at a lower depth than the one at Messrs. Meux's brewery, and which was discontinued at 1,144 feet. The mystery and want of knowledge that seems to have characterised all concerned in the proceeding, is one reason why the town has lost confidence in the Water Committee, and the inhabitants would have been much better satisfied if its members had frankly declared their ignorance, and sought additional advice from experts as to the advisability of continuing or discontinuing the boring. But instead of adopting this course, the resident engineer calmly assures the public 'that a little delay has occurred in providing the cylinders necessary to protect the hole from the sandstone marl (Old Red?) that has caused some little trouble by falling in. These cylinders are hourly expected, and will take very little time to place in the well, when the boring will be recommenced, and in all probably, a result will soon be obtained.' Certainly, if the Committee goes on much longer in this heroic manner, we may in time obtain some very remarkable geological results, though the arrival of the water seems to be more problematical than ever. By ultimately solving the question of the earth's central heat, the Richmond Water Committee may expect to render themselves immortal.

The question of cost is a very serious one, but is treated by the committee in the same light-hearted and happy manner, which perhaps is not to be wondered at, as it is only the ratepayers' money which is being thrown into the hole, and a very infinitesimal portion comes upon themselves. The contract price was for £28,000, including a margin for unforeseen contingencies. But these unforeseen contingencies have now reached the enormous sum of £73,000, and, by their own showing, not a single member of the Water Committee or the Vestry have the remotest idea as to the probable limit to the cost. This, too, after seven years' groping, when the promise was made to finish the well in six months' time! Putting aside the various occasions during the seven years at which outcries have arisen at the scarcity of water, the town would have con-

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doned the broken promises (for vestries have a marvellous power of obtaining absolution) if there had been the slightest appearance of confusion or confession on the part of the peccant body. But instead of this, the Water Committee hold on their way with imperturbable serenity, publishing no details, vouchsafing no information, and refusing to take into their confidence even their brother members of the Vestry. Now and again, when pressed too hard, the Committee have threatened to resign, which terrible possibility has always had the immediate effect of bringing the Vestry to its bearings, by abjectly entreating the Committee to go on with its duties, and think no more of resignation.

The resident engineer has lately published a statement as to the present supply, to the following effect: 'That the artesian well had reached a depth of 1,279 feet, 845 feet below the old boring, and 136 feet below the contract depth, and is still unfinished. Nearly 200 new services have been connected since July 1882, and 532 since the engineer first made application to the committee, and the deficiency is owing to less rainfall, which has caused people to use a larger quantity for garden purposes and for additional baths. The greatest interval in the supply has been two days, an alternate day supply which lasted five days, during which period the largest number of complaints were received. The total quantity of water available during the week in which the intermittent supply was given equalled 395,113 gallons daily, which gives 20½ gallons per head for a population taken at 19,200. The water for trade purposes equalled 8,828 gallons, making a total of 403,941 gallons supplied from the wells, while that for road watering, and for the public baths (drawn from the river) equalled 56,297 gallons per diem, making a grand total of 460,238 gallons from all sources. The principal complaint has come from the Kew district, which is a new one.'

This Utopian view of the case rather landed the Water Committee on the horns of a dilemma. Putting aside some inaccuracies, such as the unusually dry weather (for, as a matter of fact, the outcry of scarcity began before the dry weather set in, and not afterwards), it was notorious that the population, which was fewer than usual, in consequence of great numbers of the inhabitants having betaken themselves to more pleasant climes, was not supplied with the alleged quantity per day, as many houses were absolutely without water for two or three days together. After the alarm was given, and before the Southwark and Vauxhall Company came to the rescue, there certainly was an ample supply for several days; but it seems perfectly clear that such supply could not have been furnished, either by the artesian or by Petersham well, and the only other source, therefore, must have been the river, unfiltered and tainted with sewage.

Reverting to the cost, a member of the Water Committee has endeavoured to show that, by dispensing with the services of the Southwark and Vauxhall Company, the parish had been saved £19,786 during the six years, and he arrived at these figures by asserting that the ratepayers had paid for water to the Vestry £29,191, whereas the Southwark and Vauxhall rates would have been £48 978. Moreover, that out of what the Vestry had received, £7,500 of the loans had been paid off, and this sum ought to be added, making a total saving of £27,286. But a member of the Vestry (for birds in their little nests do not always agree) shows, on the other hand, that, of the £73,000 spent on the water-supply, only £45,000 is represented by permanent works, while £51,950 stands as an existing debt of the parish. When the Southwark and Vauxhall Company finally severed connection with Richmond in 1877, they made an offer to take over the works (reservoirs and wells) contracted for by the Vestry, and to carry them out at their own cost, and to charge the ratepayers four per cent. on the annual value of their holdings. This, however, was rejected by the Vestry, who would have nothing to say to the Southwark and Vauxhall Company. We have seen the results.

A few words will deal with the emergency, and how it was obviated. The deficiency of water became so alarming from every point of view, and the incapacity of those in charge of the water so glaring, that it was felt that no remedy, either immediate or subsequent, was likely to be obtained from the Vestry; and a meeting was held at the house of a resident on Richmond Hill, which assemblage, though necessarily not large (on account of so many persons being away for their holidays) was fairly representative. A deputation was then and there arranged to wait upon Sir Charles Dilke, and lay before him the grievance from which the town was suffering. The President of the Local Government Board, while admitting that he could only then deal with the emergency, and even in this direction more as a mediator than in any other capacity, immediately sent Colonel Bolton to Richmond to use his good offices; and this was done to such good effect, that within a few hours the connection was again opened with the Southwark and Vauxhall Company's main, and a plentiful supply of water obtained. Amidst so much local mismanagement, it is a pleasure to record such an admirable instance of prompt and beneficial Government interference.

It should be stated, in justice to the Vestry, that, prior to Colonel Bolton's intervention, a negotiation had passed between them and the Southwark and Vauxhall Company about May last, from which it appears that the latter wished the Vestry to enter into an agreement that the maximum daily quantity of water which the Company should be bound to supply should be a million gallons, and that the Vestry should pay for a minimum quantity of 600,000 gallons per week, the supply to be used for the public baths only. The Committee had previously proposed to take for the baths and other purposes a maximum weekly quantity of 600,000 gallons and a minimum supply of 300,000 up to September 29, and thereafter, between May 1 and September 29 in each year, as so much would not be required in the winter. One of the clauses to which the Vestry very much objected was to the effect that the Company should not be liable to make compensation if from frost, drought, or other causes beyond their control, the water-supply should be deficient; the Water Committee naturally considering that drought was just the principal cause which would induce the town to take the Company's water. Another clause was to give the Company the power to open the streets at any time; a third, to fix the price of the water at 1s. per 1,000 gallons, and to require a deposit of £500. All these terms were certainly somewhat stringent, but it must be remembered, on the other hand, that they were the terms of Hobson's choice, made, probably, a trifle more harsh by the previous behaviour of the Vestry to the company. Of course, it is to be pre-

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sumed that the arrangement is only temporary, because it cannot be for a moment supposed that the town, having spent so much money, would be willing to altogether abandon the efforts to acquire independent water, particularly as it is to be hoped that a purer quality may be eventually obtained than even the Southwark and Vauxhall filtered Thames water.

In view of the extreme blundering that has taken place, it can scarcely be possible to avoid a full inquiry by the Local Government Board, and all sensible people in Richmond, who are not blinded by party feeling and conceit, feel that it is the only way to wipe off a reproach to the place, as well as to avoid a recurrence of such serious mismanagement.

The money question is a serious one, and will have to be investigated *ab initio*, as it is clear that the Water Committee do not know enough of the subject to be empowered to deal with such large sums; and, even at this stage, the proceedings of the Vestry at their meeting on September 4 showed an entire want of appreciation of the difficulties and dangers in which the question is involved. Neither engineer, contractor, or Water Committee appeared to know where they were. There was no clerk of the works; while a fresh instalment of money was nearly being paid, without any certificate. What is to be the fate of the new sinking is very problematical, though the balance is against the probability of an ample supply being found. Should water appear, then the Vestry will be luckier than it deserves; but, even before experts could give any opinion, a clear and exhaustive statement of the sections should be furnished—that is, if the engineer has kept such a one. Whether demonstrating the possibility or impossibility of finding water, it will at all events be an instructive lesson, and a warning to future vestries against delegating such delicate engineering tasks to men who are not qualified by knowledge, education, or temper to undertake them.

Children's Hospital, Paddington Green.—The sanitary arrangements of this new hospital have been carried out under the direction of the Sanitary Assurance Association, of 5 Argyll Place, W., and at a meeting of the Council of the Association on August 13, Sir Joseph Fayrer, F.R.S., in the chair, the certificate of the Association was sealed.

The Artisans' Dwellings Acts in Clerkenwell.—The Home Secretary having recently addressed a circular to the vestries and district boards of the metropolis suggesting that the medical officers of health should have directions to examine the districts under their charge concerning such areas as they shall consider to be unhealthy, with a view of their being dealt with under the provisions of the Artisans and Labourers' Dwellings Acts, Dr Griffiths, medical officer of health for Clerkenwell, and the sanitary committee of the vestry, have viewed a number of places submitted to their consideration, to be dealt with under the above-mentioned Acts, and have made a report condemnatory of houses in several parts of the parish.

The Council of Public Health for the department of the Seine has adopted a report presented by M. Brouardel against the institution of cremation in times of epidemics. M. Brouardel alleges that the adoption of this means of disposing of the dead would be fraught with danger to the interests of justice, especially during an outbreak of cholera. The Council afterwards nominated a commission intrusted to inquire whether it would not be advisable as an experiment to permit the cremation of bodies which have been used for anatomical studies.

BUILDING MATERIALS.

By John Slater, F.F.

Fellow of the Royal Institute of British Architects.

III.—Building Stones.

It has been already stated in a previous article that the architecture of a country or district is largely influenced by the nature of the building material found ready to hand in the immediate neighbourhood. It is probable that almost all architecture, properly so called, has developed from the forms of simple wooden erections, for there is little doubt that the earliest builders had recourse to timber as the most easily manipulated material for the construction of rude huts to shelter themselves from the weather. As men advanced in intelligence and skill, they could not fail to contrast with the ephemeral and destructible character of these huts the solid and lasting properties of the various rocks and stones which nature has provided so lavishly in nearly all parts of the globe. We may be sure, therefore, that as soon as men settled down into communities, and nomadic existence began to be abandoned, the inhabitants of any district where stone existed would speedily devise means, first of boring into the rocks and making cave dwellings, and then of quarrying and cutting the stone and using it for buildings. As far as can be judged from the few remains that have come down to us, the method of using this material was the same among all the primitive stone builders, their work being characterised by great size and great simplicity; and this is what might be expected, for the labour of cutting stone with rude implements must have been great, and consequently blocks were never divided more than was absolutely necessary. The durability of these early stone buildings depended partly upon the climate, whether wet or dry, and partly upon the nature of the stone; this was a matter of accident, for at a time when transport was almost an impossibility, the most valuable characteristic of any building material would be its propinquity to the place where it was wanted, and no selection of one kind before another was possible. As civilisation increased and buildings of greater size and more elaboration began to be erected, the building stones of certain localities became widely known, and with the spread of luxury and the desire for excessive ornamentation of public buildings which characterised the era of the Roman Emperors, the rarest and most costly marbles and porphyries were obtained at vast expense from the furthest limits of the known world. It must be admitted that for large and important public edifices natural stone is a nobler and more suitable building material than any artificial production; but for a locality where it is not indigenous, the greatest possible care is required in the selection of stone, particularly with reference to the climatic conditions which it will have to submit to, and it is from an undue appreciation of these that some of the most conspicuous failures of building stones in London have resulted.

It would be impossible in this article even to enumerate the various kinds of building stones now in use, nor shall I attempt any accurate scientific classification, but shall confine myself to a short description of the three kinds of stone chiefly used for structural purposes—granites, sandstones, and limestones. It may be mentioned that the word 'freestone,' so frequently

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used, is entirely without signification as to the real nature of any stone, as it includes both limestones and sandstones, and simply means a stone that can be sawn or worked with hammer or chisel; in fact, in this as in too many other branches of practical architecture, the vaguest kind of nomenclature exists.

1. Granite, although used principally for ornamental purposes in London and its neighbourhood, is extensively employed for buildings in other parts of the United Kingdom, and naturally claims the first place among stones, not only on account of its hardness and durability, but chiefly because it is the material in which were embodied the earliest efforts of the stone-worker's craft. The columns, obelisks, and other monumental remains which have been found in such profusion in Upper Egypt, are so well preserved, partly owing to the dry climate of the country, but chiefly to the fact that they are all worked in the hardest granite, that they have enabled us, by means of the hieroglyphic inscriptions upon them, to reconstruct faithfully all the features of a civilisation dating back to the most remote antiquity. Granite is one of the oldest of rocks geologically and is of igneous origin, consisting of quartz, felspar, and mica, with small quantities of various other ingredients which, according to their nature and the proportions in which they occur, cause endless variations of texture, colour, &c.; the prevailing tints are grey and pink. In England granite is sparsely developed, the principal quarries being in Devon and Cornwall and at Mount Sorel in Leicestershire, but the Scotch granites have a widespread reputation, the red granite of Peterhead, the grey of Aberdeen, and the pink granites of the Isle of Mull being used very extensively. Excellent specimens of granite are found in Ireland, and attempts are now being made to utilise them more extensively.

The chemical composition of granite—averaged from thirteen analyses given by Mr. Hull—is silica, 71·7 per cent.; alumina, 15·15; soda and potash, 7·49; oxides of iron or manganese, 3·01; lime, 1·74; its specific gravity is 2·66. Granite is quarried in very large blocks and, as a rule, no signs of lamination are found, but some species of granite in which mica is present in excessive quantities, closely approach gneiss in character and here lamination is distinctly visible. When this is the case care should be taken that the blocks are laid on their natural bed in a building. When the mica is replaced by hornblende the granite becomes a syenite. Granite is crystalline, granular, and of extreme hardness, so much so that it is impossible to work it into elaborate and intricate mouldings. Hence in districts where it is abundant the architecture has a character of its own and is of a somewhat massive and severe type, as may be seen in the churches and public buildings of Brittany, which have a quiet grandeur and breadth of effect that is most impressive. Aberdeen and St. Petersburg are good examples of granite-built cities. Granite will absorb but a very small quantity of water and this renders it such an admirable material for external use, but hard and weather-proof as it is, the felspar in its composition has a tendency to decompose under the action of the air, and this is probably the cause of the rough weather-beaten appearance of some of the older granite buildings. Consequently, granites in which the felspar crystals largely predominate should not be selected for external use.

The cost of carriage and of working will always prevent granite being used to any great extent at a distance from the quarry, but if any one desirous of using this material were to take the trouble to make personal inquiries at some of the Scotch quarries, he would find that blocks worked to the required size and shape, and perfectly ready for fixing in position, can be supplied at a far cheaper rate than is generally imagined.

2. Building stones of the sandstone group, which is widely distributed over the United Kingdom, are of aqueous origin, mechanically formed, and of varying geological age, from the old red sandstone of the Devonian system up to the Kentish rag which lies at the base of the Cretaceous system. Sandstone is chiefly composed of grains of quartz united by various kinds of cementitious material, either siliceous, ferruginous, or calcareous, and it is mainly upon the nature of this cementing substance that the suitability of the stone for building purposes depends. Some varieties are extremely hard and close-grained, some are very coarse, and others are so soft and porous that they can be used for filtering water. In colour they vary from red, brown, and yellow to almost pure white, the chief determinant of the colour being iron. They are almost always laminated, and hence it is of the utmost importance that the blocks, when used in building, should be laid on their natural bed. Although from the nature of its composition sandstone is not so liable to be affected by the atmosphere as limestone, the condition of Chester, Carlisle, and Durham Cathedrals shows the evil result of using inferior qualities of stone.

The sandstone quarries in England are very numerous, and a few only can be mentioned, but it must always be borne in mind that very different qualities of stone are obtained from the same quarry, and for any important work a personal inspection of the stone at the quarry is most desirable.

In Yorkshire the Bramley Fall-stone which is a fine-grained combination of quartz and felspar joined by an argillo-siliceous cement is good and durable.

The stone from Aislaby, which was used in Whitby Abbey, proved very durable, and this building was noticed as a good instance of preservation of sandstone by the Commission which sat in 1839 for the purpose of deciding upon the best kind of stone for the new Houses of Parliament. Elland Edge, Park Spring, and Gatherley Moor are also well known Yorkshire quarries. In many of the Yorkshire quarries in the neighbourhood of the coal-fields, the stone lies in a series of comparatively thin beds from which are taken the well known York flags. In Northumberland are the Heddon and Kenton quarries, the stone from which much resembles the Bramley Fall; in Lancashire, the Longridge Fell, in Derby, the Darley Dale, and in Durham the Stenton quarries may be mentioned as having supplied excellent stone for buildings in their respective localities. Manley, in Cheshire, is supplying the red stone with which Chester Cathedral has been partly restored, and Peckforton, in the same county, supplies a stone of very similar quality. Hollington and Crumpwood, in Staffordshire, Grinshill, in Shropshire, Hadley, in Worcestershire, and Calverley, in Sussex, all supply a fine-grained sandstone of first rate quality. Some of the Kentish rag stone, which is a calcareous sandstone, quarried in Maidstone and the neighbourhood, is, if carefully selected, excellent for building purposes, and it com-

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pares very favourably with other kinds of stone in price.

At Craigleith, near Edinburgh, is a quarry of beautiful light-coloured fine-grained sandstone, to which that city owes its striking appearance, and which has also been largely exported.

It will easily be imagined that the chemical composition of sandstone varies considerably; but the following analysis—averaged from several examples—may be taken as a fair specimen: silica, 95·7; carb. lime, 1·06; iron, 2·15; water, 0·81. Its specific gravity is about 2·16.

3. We now come to the calcareous group of building stones, or limestones, which, like sandstones, are of aqueous origin, but formed organically or chemically, instead of mechanically. Whereas sandstone is composed mainly of the sedimentary deposits of inorganic matter, limestone is largely, and in some cases almost exclusively, formed of the stratified organic remains of living creatures of low organisation, such as starfish, coral animals, and molluscs. Limestones range from the carboniferous to the lower tertiary geological age, and may be classed for building purposes as crystalline, magnesian, and oolitic. The crystalline limestone generally exists in the form of marble, and as such is used for ornamental purposes mainly in this country, so that it scarcely comes under the category of building stones. It is, however, widely distributed over England, and is found in numerous varieties of tints, so that for decorative purposes it can be used with admirable effect as a contrast to other kinds of stone.

The Derbyshire, Devonshire, Purbeck, and Irish marbles are now becoming more extensively used for ornamental work; but it should never be forgotten, however tempting it may be to adorn the façades of modern buildings with beautiful variegated marble columns, that the constitution of the material is such that it will not stand if exposed to a smoky atmosphere.

The magnesian limestone, or dolomite formation, contains some of the best building stones in the country. As a rule, these are slightly crystalline, composed in the main of carbonate of lime and carbonate of magnesia in nearly equal proportions, with a little silica, the proportion of which is largely increased in some of the stone found near Mansfield, which may be described either as a siliceous limestone or a calcareous sandstone. The magnesian limestones became greatly enhanced in repute in consequence of the report of the Commissioners in 1839, who recommended that the Bolsover Moor stone from Derbyshire should be used for the new Houses of Parliament. This stone or one very similar was used in the construction of the choir of Southwell Minster, which dates from the twelfth century, and is in very good preservation. The greater portion of the Houses of Parliament was, however, built of stone from the Anstone quarries, similar to that from Bolsover Moor, and the result has wofully belied the recommendations of the Commissioners, for a reason which will be referred to later on. The stone from Roche Abbey, near Bawtry, in Yorkshire, has proved very durable where it has been used; but at Huddlestone, Doncaster, and York, the magnesian limestones have suffered severely, and there is little doubt that all these stones would fail in London. The analysis of an average magnesian limestone is carb. of lime 51·38 per cent., carb. of magnesia 41·4, silica 3·65 (and the more of this there is the better), and water 2·9. Its specific gravity is 2·32. The colour is generally yellowish brown, which deepens into red in the Mansfield district.

The oolitic limestones which extend from Dorsetshire to Yorkshire comprise the well-known Bath and Portland beds, and the renowned Caen stone of Normandy is of the same formation. These limestones derive their name from the fact that they are composed of a number of minute oviform bodies like the roe of a fish, cemented together in a calcareous matrix. As a rule the stone is very soft when first quarried, but hardens with exposure, and changes from a white to a yellowish tint: it is rich in organic remains. There are four distinct bands of stone in the oolitic series—viz. (1) The inferior oolite, which occurs chiefly in Gloucestershire, and from which the stone for Gloucester Cathedral and Tewkesbury Abbey was obtained. The best quarry at the present time is at Painswick. (2) The great or Bath oolite, which is of considerable thickness in the neighbourhood of Bath, and is generally worked by tunnelling, as in Messrs. Pictor's quarries at Box, which extend for many miles underground, and large piers of stone have to be left to support the roof of the workings. Very large blocks of this stone can be obtained. Among the best known quarries of Bath stone may be mentioned Corsham Down, Monk's Park, Coombe Down, Box Hill, and Doulting. The average analysis of Bath stone is carb. of lime 94·5, carb. of magnesia 2·5, iron and alumina 1·2, water 1·7. The average specific gravity is 1·93. It will be particularly noticed that this stone contains no silica. The great oolite formation extends northwards of Bath into Northamptonshire and Lincolnshire, the chief quarries being at Barnack, near Stamford, the stone from which was used at Peterborough Cathedral; Kelton, from which many of the Cambridge colleges were built; and Ancaster, near Sleaford. The latter stone is often crystalline in its formation. (3) Coral rag, which passes from Somerset to Yorkshire with numerous interruptions. This is a rubbly stone, and is hardly ever found sufficiently compact to be used for building purposes. (4) Portland stone. This is harder and more durable than most of the lower members of the oolitic series; it is cream-coloured and full of organic remains; in fact, such a quantity of large fossils are found in it that it is unsuited for delicate work. This stone derives its name from the Isle of Portland, where it is found, the chief quarries being Gosling's, Vern Street, Waycroft, and Grove. The total thickness of the stone here is about 70 feet, but only about 20 feet of it, and that in different layers, are suitable for building, the layers differing much from one another: the bottom bed is generally the best on the east side of the island, while on the west the middle or white bed gives the best stone. During the last two centuries Portland stone has been extensively used in London: St. Paul's Cathedral, the Reform Club, and Goldsmith's Hall may be mentioned as some of the principal examples. Of the oolitic limestones Portland is certainly the best adapted to resist atmospheric influences, but the modern stone does not seem to be so hard as that which was used in the seventeenth century. The average analysis is carbonate of lime, 95·16; silica, 1·2; carbonate of magnesia, 1·2; iron, &c., 0·50; water, 1·6. Its specific gravity is 2·2.

In France the great oolite formation yields the beautiful Caen stone, which is very fine-grained and uniform in texture. This stone has been largely

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exported into England, and no finer stone can be used for interior work; but it is a mistake to employ it for exteriors, as many parts of Canterbury Cathedral plainly show. A stone closely resembling the Caen stone, and quarried at Beer, near Axminster, in Devonshire, has recently been brought somewhat prominently into notice through the energy of the proprietors, and at the present time a large building in Leicester Square is being erected of this stone. It is of good colour and close grained, but somewhat friable, and has been in use for some time past in the neighbourhood of the quarries; but the conditions of the London atmosphere are widely different, and it will be very interesting to watch the behaviour of the stone under its more trying ordeal.

Having thus briefly described the various kinds of building stone, we have to consider generally what are the requisite qualities in any stone that it may last when exposed to the weather, and before this question can be answered the causes of the decay of stone must be shortly inquired into. These are in the main two, disintegration and decomposition, the former acting mechanically and the latter chemically. All stones, even granite, absorb a certain quantity of moisture, some more, some less, and, as a rule, those which absorb the most water are the most liable to disintegration, because after absorption, on the occurrence of frost the water expands, and by mere mechanical pressure forces apart the minute particles composing the stone. Hence the rate at which a stone absorbs water and the readiness with which it parts with it are very important elements to be considered, much more so, in fact, than the *total* amount of water which a stone will take up. Experiments have frequently been made to ascertain the proportion of water to its own bulk that a stone will take up when completely saturated; but, although this is an important fact to know, practically, stone in a building never has to submit to such a test; and it will be readily understood that if one sample of stone when completely saturated absorbs 10 per cent. of its own weight of water and another only 8 per cent., yet if the former take three times as long as the latter to become saturated, it is, *cæteris paribus*, the better stone. A complete series of experiments as to the rate of absorption of water would be of great service, but care would have to be taken that at the outset of the experiments all the specimens should be perfectly dry, otherwise the results obtained would be misleading. No kind of stone is so variable in this property of absorbing moisture as sandstone, and hence it is extremely important to test it beforehand.

In London and in any place where the climate is damp and the atmosphere smoky, the mechanical disintegration of a stone is largely assisted and frequently started by chemical decomposition, and in order to guard against this a careful examination of the chemical analysis of a stone is very desirable. The sulphurous and hydrochloric acids in the atmosphere, which are readily taken up by rain water, act upon the calcareous ingredients of stone, producing oxidation or hydration; where mineral salts occur, various chemical reactions take place, and minute crystals are formed in the interior of the stone which effloresce outwards; and where organic matter exists, as is the case in nearly all stratified deposits, this gives rise to nitration. Inorganic matter, such as the minute grains of quartz which compose most of the sandstones, is not acted on by these acids; so that in a sandstone the nature of the cementitious material which binds together these grains is the important point; the more siliceous and the less calcareous this is, the better. The presence of carbonate of lime can easily be detected by the use of dilute hydrochloric acid, which will cause effervescence. In the limestones we have to deal with entirely different constituents. The magnesian limestones, as has been pointed out, contain a certain proportion of silica, and are generally somewhat crystalline in texture, their main constituents being carbonate of lime and carbonate of magnesia; and it has been ascertained that the more nearly these components exist in equal proportions, the more durable is the stone. The Commissioners of 1839, who have been already alluded to, found specimens of this stone in better preservation than any other, and hence they recommended its use. But they appear totally to have ignored the fact that magnesia has a strong affinity for sulphur, which exists so largely in the London atmosphere, and hence has resulted the terrible decay in the stone used in the Houses of Parliament. When we come to the oolitic limestones, such as Bath, we find no silica at all, but almost entirely carbonate of lime; but as the stone is soft and easily worked, it has been largely used for copings and dressings to brick-built houses in London, and it looks very well when first put up. But in the case of the majority of the pretentious stone enrichments of suburban houses, no care whatever has been taken that the stone should be weathered before using, and it is no uncommon thing to find such stone crumbling away after two years' exposure. But however well this stone may have been weathered, it is extremely doubtful whether it ought under any circumstances to be used in a smoky atmosphere. For dry climates where there is little smoke, and for internal work it is, however, admirably adapted, as it can easily be worked into most intricate mouldings; but it must always be remembered that in external work elaboration of ornament means increased liability to decay. Of course, the chemical composition of a stone is not the only point to be looked to; it should be hard, tough, compact, and non-porous; and it is its superiority in these points that renders Portland so much preferable to Bath as a building stone. The specific gravity should also always be ascertained; for, as a rule among stones of the same class, the greater the specific gravity of a stone, the greater will be its cohesive strength. As regards colour in stone, this is chiefly due to the presence of iron in various states; and if uniformity of colour in a stone building is a desideratum, an original bluish-grey tint should be avoided, as exposure to the weather generally produces an uneven yellowish tint, due to oxidation. Red stones generally retain their colour well.

After a stone has once begun to decay it is very difficult to arrest the process, but numerous expedients have been resorted to for the purpose of preserving stone from decay. Among these may be mentioned Kühlmann's process, which consisted in washing the face of the stone with a solution that was able to convert the soluble constituents of the stone into a non-absorbent insoluble substance. This was applicable only to stones where carbonate of lime predominates, and the action was very slow. Ransome's process consists in causing the stone to absorb a quantity of silicate of soda, and then washing it with chloride of calcium, the result being that silicate of lime is deposited in the pores, and the

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soluble salts effloresce on the surface and are soon washed away. Other processes are those of Hutchinson, Davies, and Szerelmy, but it cannot be said that any of these is an unmixed success, nor is this to be wondered at. The composition of building stones is so varied that it is almost impossible that a solution that would act as a preservative to one kind should be equally useful with another, and it is from this fact having been lost sight of that so many failures have resulted. A simple, and, as far as it goes, an effective means of preserving stone is to wash over the exterior face of a building with one or two coats of boiled linseed oil. This prevents the water entering the pores of the stone, but the application requires to be repeated every few years.*

In using stone in a building it should never be forgotten that the stone should be placed on its natural bed, that is, in the same position in which it was originally deposited in the quarry. In the case of granite and non-laminated stones this is not so important, but the majority of building stones are more or less laminated, and if not placed on the bed, the various layers of the stone would gradually flake away and fall off like sheets of paper. It is also of the greatest importance that the surfaces of the bedding joints of blocks of stone should be accurately dressed and perfectly level. This is a point that is frequently neglected through carelessness or haste on the part of the stone setters, and the consequence is that the pressure over the surface of the blocks is unequal and the stone breaks. There is no more fruitful source of failure in stone buildings than this.

In conclusion, there is one point that cannot be too strongly insisted upon, and that is the undesirability of pinning one's faith to any one stone or to any one quarry. The blocks that are being got out to-day may be excellent, but those which are reached a few weeks hence may be vastly inferior in all respects through variations in the mineral character of the stone. Hence for a large building constant care and attention is required in examining the stone as it is delivered from the quarry.

GAS AND WATER ORDERS.—The report by the Board of Trade of their proceedings under the Gas and Waterworks Facilities Act, 1870, during the present session, has just been issued. Sixteen gas and water orders were applied for, all of which were granted by the Board of Trade and confirmed by Parliament.

STATE RECOGNITION OF HYGIENE.—The Lords of the Committee of Council on Education have sanctioned the addition of hygiene to the list of sciences towards instruction in which aid is afforded by the Science and Art Department:—The following is the syllabus of the subjects:—Elementary stage: (1) food, diet, and cooking; (2) water and beverages; (3) air; (4) removal of waste and impurities; (5) shelter and warming; (6) local conditions; (7) personal hygiene; (8) treatment of slight wounds and accidents. Advanced stage: (1) food and adulterations; (2) water and beverages; (3) examination of air—chemical and microscopical; (4) removal of waste and impurities; (5) shelter and warming; (6) local conditions; (7) personal hygiene; (8) prevention of disease. Honours:—In addition to the topics enumerated under the elementary and advanced stages, questions will be set in the following subjects: trades nuisances, vital statistics, sanitary law.

* Quite recently a new process has been invented for silicating soft limestones by saturating them with a strong solution of fluosilicate of some metal, such as magnesium or zinc. It is claimed for this process that it strongly indurates the stone, and that, the resulting products being insoluble, the rain has no effect upon them.

HYGIENE OF SCHOOLS IN AMERICA.

(BY OUR AMERICAN CORRESPONDENT.)

EACH State, as a rule, has its Commissioner of Education, who is required by the statutes of the State to present an annual report, which shall be not only statistical, but also filled with suggestions in accordance with the most enlightened views of the day. Compulsory sanitation usually stops here. Excellent as these yearly suggestions may be, they are often disregarded, and a short-sighted policy hinders their fulfilment. They are too frequently looked upon in the light of after-dinner speeches — 'very pretty indeed, very sensible, perhaps, but then, you know' — and a shrug of the shoulders brings the subject to an abrupt termination. To be sure, the recent rules regulating sanitary plumbing are sufficient in themselves to render needless any precise requirements of a like nature from the various Boards of Education. In most cities nowadays the plumbing may be safely left in the hands of the plumbers; the rules regulating *their* work will protect the schools from their own carelessness in not looking after what should be *their* work as well. In other words, assurance might be made doubly sure if the Boards of Education were to issue a series of requirements in regard to all sanitary work done on their behalf; these requirements agreeing in all essential particulars with those of the plumbers the result would be almost ideal. Thanks to modern improvements, however, the schools do not suffer as much as formerly from this neglect.

In some localities excellent rules exist in regard to the prevention of contagious diseases. In accordance with the requirements of the State Board of Health of Massachusetts, the Boston public schools are safeguarded in the following manner:—Every case of contagious disease is immediately reported to the Board. The patient is kept away from the school, and a health inspector is sent to the house, where he leaves printed instructions regarding the care of the child. In cases of diphtheria he sees that the premises are well fumigated. The official returns of deaths among the children are strikingly less every year.

The Boards of Health sometimes have occasion to exercise their authority over the heads of the Educational Commissioners—the latter gentlemen being too often occupied with educational and other matters to the exclusion of a correct sanitary watchfulness. The most flagrant case of this kind that I know of occurred about two years ago in Brooklyn. The sanitary inspector reported to the Health Commissioner that in a certain school '500 little children were packed into the space intended for 300. The number of cubic feet of air per child was about fifty, an entirely inadequate supply. Fresh air was admitted in the different rooms by a direct draught, as that was the only means provided for ventilation. Some twenty feet in the rear was a privy vault, which seemed to have had no sewer connection, and was furnished with no means of flushing. The unpleasant and poisonous air from the vault found ready entrance into the different school-rooms through the open windows, which were lowered for ventilation.' The Board of Education was notified, but no action was taken by that body. The Commissioner of Health then ordered the school to be closed, and forbade its reopening without his special permit.

Thus it may be seen that, although the Educa-

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tional Boards, as a rule, do not enforce sufficiently stringent rules to secure the hygienic welfare of the students, this welfare is nevertheless safe-guarded—1, by the rules regulating plumbers' work; and, 2, by the protection afforded by the Boards of Health. The rules of the Educational Boards should embrace *all* the sanitary laws extant; if they did, the children committed to their care would be protected against possible violations of the plumbing laws, or against possibly negligent Boards of Health. (We all know how very possible both are, even in these latter days.)

But, although these general requirements do not exist, sanitary science has nevertheless done marvels for the schools. If a capable officer is at the head of the Educational Department, it generally follows that the health of the students is well cared for. Indeed, as I have endeavoured to show, according to the present condition of affairs, the health of the students depends upon the personal care of the officer in charge; whereas it should depend upon general rules which could be enforced whether the officer was or was not careful.

A recent report of the Ohio Commissioner quotes the rule made many years ago by an intelligent board of education in that State, to the effect that no school-house should be erected on premises less than 200 by 200 feet. The school-houses in Ohio are, therefore, open to light and pure air. There are a large number of public school-houses throughout the State occupying from two- to five-acre premises. The elegant building at Urbana is in the midst of a beautiful grove of fifteen acres. The children in the Ohio schools are not forced into the streets to find a playground. The school premises are sufficiently spacious in themselves.

The report of the New York State Board of Health contains a paper from the Committee on Public Institutions, in which several cities are mentioned with praise as having fine school buildings. Bad lighting seems to be a general fault. Dr. F. Park Lewis, of Buffalo, after an examination of the schools of that city, said: 'With the lighting of only one school was I at all pleased. In this, which is one of the newest and best that we have, most of the requirements appear to have been tolerably well fulfilled. The arrangement is as follows:—A wide hall traverses the building on either side from front to rear, while by another, passing through the centre of the building, these are united. From this latter are the entrances to the rooms for recitation and study. There are no windows on the inner side of the former halls, and in almost every room the light comes from large windows back of the children. The corner rooms alone are lighted from two sides. and in these, as in all of the others, inner blinds allow a modification of the light. The walls have been lightly tinted with blue, cream, or green, and the reflection is far more restful than the glaring white found in many buildings.'

Ventilation has also improved the atmospheric condition of affairs in many schools. The shaft system has been introduced with success in some places. The *Sanitary Engineer* describes the application of this system to one of the Rochester (N.Y.) schools as follows:—'The main shaft was erected outside the building at the angle formed by the junction of the two portions of the structure. The ventilating flues descend from each room to the bottom of the shaft within the building, opening into the shaft in the basement. In the bottom of the shaft a small stove maintains a constant combustion of fuel during school hours. The removal of the foul air from the various rooms is continuous, rapid, and very perfect.'

The heating problem is being discussed with considerable fervour and intelligence; and this in itself is a sign of advancement. A method was proposed not long ago of admitting the heated air into the school-room near the ceiling, where the cold air from the windows will cause it to sink to the floor, where again the outlet tubes will carry it away, these tubes being connected with ventilators on the roof. The usual discomfort of sitting in a heated, and often smoky, atmosphere, is thus avoided.

It would be impossible, in a paper of this sort, to give a detailed account of the various sanitary improvements that have been made lately in regard to school buildings. The following general commendation of one of our leading medical journals must suffice. 'Some undoubted progress in school hygiene can now be recorded. The subject is being practically studied in Massachusetts, Wisconsin, Ohio, Maryland, and elsewhere. It is in the western States that some of the best work is done. The Wisconsin State Board of Health has, in particular, published some excellent papers on the subject.'

The Brooklyn Board of Education in 1877 passed the following resolution:—'The seating capacity of all school-houses, school and class rooms, of 16 feet height of ceiling, ought to be limited to 9 sq. ft. of floor space and 150 cubic feet of air space for each occupant. And it is hereby recommended that all local committees, as soon as practicable, reduce the number of pupils to conform to this basis. In rooms of less than 16 feet height of ceiling the ratio of floor space should be proportionately increased.'

This resolution has never been practically followed out, so far as I know; but attention has been drawn to it of late, and great things are expected in the way of educational reform pointed out in these rules.

The special 'honourable mention' of isolated cases argues that the majority of American school buildings are not yet what they ought to be. Not only in the public schools, to which attention has been chiefly directed, but in the private institutions also (which are not under the same State surveillance as the former, and which are therefore liable to become more careless in their sanitary arrangements) great reforms are needed. The subject is being pressed home, however, by the sturdy champions of health, and old ideas are gradually giving place to new. It should be mentioned that the two men who have perhaps done more for this cause in America than any other are Dr. D. F. Lincoln, of Boston, the chairman of the Department of Health of the Social Science Association, and the editor of the *Sanitary Engineer*. This paper has fought the New York schools with such success that we begin to see the dawn of a better day. But the smoke has not yet blown away; the battle is not yet ended. It is undoubtedly true that the schools have been most culpably neglectful of the health of their children. The crying sins have been—1. Dampness of site of school-house; 2. Improper sewerage; 3. The erection of malodorous water-closets. [The filthy pan-closet is in general use. In some cases a mere privy vault serves the needs of the school.] 4. Bad ventilation. 5. Improper arrangements of seats, and insufficient means of lighting the rooms. 6. Crowding a maximum number of children into a minimum amount of space. This last-mentioned fault is the

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commonest of all, and the one against which our reformers are doing battle. The improper ventilation and the insufficient lighting arrangements are the causes of much of the poor eyesight of American children. Myopia is a very general disease in this country.

But there is one subject which is perhaps the most important of all, because—even if these faults which I have mentioned be remedied, as they will be in time—this crowning evil might still work its destructive poison into the vitals of our school life. I refer to the system of crowding knowledge into young brains that obtains in our schools, especially in our more advanced public schools. The 'marking system,' which is in general favour, creates a false ambition among the pupils; and in their wild endeavours to stand first in their class, health, recreation—everything—is sacrificed. There are too many studies, and they are too injudiciously arranged. This is especially trying to young girls, who either cannot or do not counteract the influence of over study by spirited exercise. Those girls who have attained a certain distinction in the public schools are admitted after a rigid examination to the Normal School. It is here that the peculiarly trying work must be done, and the eyes of the authorities seem at last to have been opened to the evil effects of the system. I quote from a recent report of the Principal of the Philadelphia Normal School:—'Many of those admitted to the school under the present system are not capable of performing the work required, while many are rejected who are fully qualified to fulfil all its demands, and are eminently fitted to profit by the instruction. There is a growing tendency among parents, teachers, and sometimes Boards of Public Education, to favour the admission of very young pupils, who are quick and ready in acquiring what is taught in the grammar schools, to the exclusion of those who, from age and natural capacity, are more capable of meeting the demands made upon them in the Normal School. These unnaturally stimulated children, who, far too young, may pass through the school at railroad speed, frequently gain no more real knowledge of the subjects they have studied than the traveller on a railroad does of the country through which he passes. The effect upon these tender constitutions is not only injurious, but positively ruinous. Their weak physical nature is not able to bear the strain of the overtasked mental powers. They bud and blossom under a hot-house culture, but, like hot-house flowers, never attain to a strong, vigorous, intellectual development. It becomes the duty of those who see the tendency of such a practice to expose it, and ask that something be done to prevent its blighting influences. "A sound mind in a sound body" should ever be kept in mind, and all the legislation on the subject of education should aim at this result.' . . . When the principal of a Normal School thus expresses himself there is surely some hope of an improved system.

MR. J. GORDON, C.E., the Borough Surveyor of Leicester, obligingly sends us a copy of the Building Regulations of that town, as contained in the two local Acts of 1868 and 1881 that have dealt with this subject. Appended to the Regulations is a useful appendix drawn up by Mr. Gordon, amplifying and explaining certain of the more technical regulations contained in these Acts. The only criticism not of praise which we have to offer on the appendix is that the soil-pipes of houses need not be so large as Mr. Gordon recommends.

HINTS TO SANITARY INSPECTORS.

(*Continued from page* 16.)

CHAPTER IV.

FAULTS OF DRAINAGE IN HOUSES.

§ 20. *Universality of Bad Drainage.*

IT is probably unnecessary to dilate upon the evils which may arise from imperfect drainage. These evils are now generally recognised. But the universality of bad drainage is not so much appreciated as it should be. It was recently stated by an eminent sanitary engineer that in an experience of eight or ten years he had only found three houses out of about a thousand that were sound as regards their drainage. Not long ago at a meeting held at the Society of Arts, several engineers, daily accustomed to deal with the many problems associated with house drainage, gave evidence to the effect that but very few houses indeed could be counted upon as fulfilling even the most rudimentary requirements of sanitary science. At the close of the engineering portion of the subject in hand an epitome will be given, showing the percentage of houses improperly treated, in respect of drainage arrangements, and the result will be found to be somewhat startling.

The inspector's own experience, however, will teach him how greatly his duties are increased by imperfections of drainage in houses, and it is therefore of the utmost importance for him to understand the difference between good and bad drainage, and to detect the latter when he sees it.

It is positively necessary that he should be able to discern and point out not only the ordinary but the more complicated faults in drainage which obtain in nearly every house he may be called upon to inspect, whether in town or country. This knowledge must be his, and it forms one of the chief subjects of examination at various Institutes when the inspector is desirous of obtaining a certificate of competency. Moreover, an inspector in a country place has often to fulfil in part, and as best he can, the duties of a surveyor as well, and should know something more than how to fulfil the bare duties set forth in the various Acts of Parliament.

In some of the recommendations which follow, the requirements of hygiene have been studied rather than those of the law; and the practical suggestions for the inspector may therefore usefully be prefaced by a brief sketch of the law on the subject.

§ 21. *General Law as to Drainage of Houses.*

Drainage of Undrained Houses.—Where a house is without a drain sufficient for effectual drainage, the local authority must by written notice require the owner or occupier to make a covered drain,* emptying into any sewer not more than 100 feet from the site of such house; or, if there be no such sewer, then into a covered cesspool or other place not being under any house as the local authority may direct. Such drain or drains are to be of such materials and size, and to be laid at such level and with such fall as the local authority may deem necessary. If such notice is not complied with, the local authority may, after the expiration of the time specified in the

* Drain is defined by sect. 4 of the Public Health Act to mean 'any drain of and used for the drainage of one building only, or premises within the same curtilage, and made merely for the purpose of communicating therefrom with a cesspool or other like receptacle for drainage, or with a sewer into which the drainage of two or more buildings or premises occupied by different persons is conveyed.' Practically the same definition is given in sect. 250 of the Metropolis Management Act, 1855.

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notice, do the work required, and may recover in a summary manner the expenses incurred by them in so doing from the owner, or may by order declare the same to be private improvement expenses (sect. 23 of the Public Health Act). This section applies both to urban and rural sanitary authorities.

Drainage of New Houses in Urban Districts.—It is unlawful in any urban district newly to erect any house or to rebuild any house which has been pulled down to or below the ground floor, or to occupy any house so newly erected and built, unless and until a covered drain or drains be constructed, of such size and materials and at such level and with such fall as appears to the urban authority to be necessary for the effectual drainage of the house. Such drain or drains are to empty into any sewer which is within 100 feet of the house; or, if there be no sewer within that distance, into a covered cesspool (sect. 25). Contravention of this section involves a penalty of 50*l.* It will be noticed that this requirement does not extend to rural districts, unless the local authority has been invested with urban powers, which are often not applied for until a multitude of new houses have been erected on the most flagrantly insanitary principles.

Other Regulations.—Every urban authority (including, of course, rural authorities invested with urban powers), may make by-laws with respect *inter alia* to the drainage of buildings (sect. 157). The owner or occupier of any premises is entitled to cause his drains to empty into the sewers of the local authority on condition of his giving due notice and of complying with the regulations of the authority in respect of the mode in which the communications between such drains and sewers are to be made, and subject to the control of any person who may be appointed by the authority to superintend the making of such communications (sect. 21).

Nuisance from Drains.—The definition of nuisance given in sect. 91 of the Act includes 'any drain so foul or in such a state as to be a nuisance or injurious to health,' for the abatement of which the proceedings specified in the subsequent clauses of the Act may be taken. (See Chapter III. of the 'Hints.) Every local authority must provide that all drains, water-closets, earth-closets, ashpits, and cesspools within their district be constructed and kept so as not to be a nuisance or injurious to health (sect. 40).*

The obvious object of these clauses is the repression of nuisance from drains when it has arisen. But for the prevention of disease by insuring proper workmanship in the first instance there is practically no effective legislation whatever.

Powers under By-laws.—The by-laws which individual local authorities may propose for insuring proper drainage of buildings of course vary according to local circumstances. But inasmuch as all these by-laws have to be approved by the Local Government Board, it may fairly be assumed that the model code prepared by that Board—to which they have shown a great disposition to adhere—represents all the regulations that are likely to be put in force anywhere. These regulations require that the drains shall be of proper size, material, fall, and position; that they shall be imbedded in concrete, ventilated at each end, and that the inlets shall be trapped. The drains must be trapped from the sewer, there must be no right-angled junctions, and at least two untrapped openings, as near the lower and upper extremities of the drains as practicable, must be provided. Under these model by-laws every person who intends to erect a new building must send in complete plans and sections of every floor of such building, with a description of the intended mode of drainage, and a block plan showing the intended lines of drainage and the intended size, depth, and inclination of each drain, and the details of the arrangement proposed to be adopted for the ventilation of the drains.

Before covering up any drain the builder must send a notice to the surveyor of the date when the drain will be covered up. If he neglects to give such notice, and in that case only, the surveyor may have the work cut into, or laid open, or pulled down, if he cannot otherwise ascertain on inspection whether the by-laws have been contravened. The surveyor is to have free access to the work at all reasonable times for the purpose of inspection during construction, and also within a period of seven days after the completion of the building. But the surveyor cannot claim to render the occupation of a new building conditional upon his certificate as to the structural and sanitary fitness of the premises.

§ 22. *Drainage Law of the Metropolis.*

In the metropolis a little more is regulated by Act of Parliament, but there are no by-laws in force which impose the useful regulations contained in the Model By-Laws of the Local Government Board. Thus sect. 73 of the Metropolis Management Act, 1855, makes obligatory the provision of proper drains to every house, but goes a little more into detail than sect. 23 of the Public Health Act of 1875, and provides that it shall be lawful for the vestry or District Board of Works to 'cause the said works to be inspected while in progress, and from time to time during their execution to order such reasonable alterations therein, additions thereto, and abandonment of part or parts thereof, as may to the vestry or board or their officers appear, on the fuller knowledge afforded by the opening of the ground, requisite to secure the complete and perfect working of such works.'

Sect. 75 of the same Act prohibits the erection of a new house unless a proper drain be provided, and sect. 76, as amended by sects. 63 and 88 of the Metropolis Management Act, 1862, requires that seven days' notice to the authority must be given of the intention to lay or dig out the foundation of a new house, or to make any drain, under a penalty of 5*l.* and 2*l.* a day. Every foundation must be laid at such level as will permit the drainage of the house in compliance with the Act, and every drain must be made in the direction, manner, form, and of the materials and workmanship, and with such branches, &c., as the vestry shall order, and every such drain shall be under the survey and control of the authority. Sect. 82 gives the authority power of inspection of drains at all reasonable hours in the daytime, and power to open the ground in any place they think fit.

Improperly making or altering drains is punishable under sect. 83 by a penalty of 10*l.*, and if matters are not remedied within fourteen days, the local authority may do the necessary work and charge it to the person offending. Drains found in bad order or condition or requiring cleansing, alteration, or amendment, must by sect. 85 be put into proper

* For the steps to be taken when written application is made by any person to a local authority, stating that a drain, water-closet, &c., is a nuisance or injurious to health, see sect. 41 of the Public Health Act, quoted on p. 16.

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condition within a specified time, failing which the vestry may execute the necessary works.

Thus it will be seen that in many respects the Metropolitan law is inferior to the law of the provinces. There is no authority which can enforce the enactment and practical carrying out of adequate by-laws. The Metropolitan Board of Works, which can control the foundations and the stability of buildings, has no power over their drainage; but all is left to be regulated by the various vestries and District Boards of Works according to their own lights.

and that the pipes from the closets are in direct communication with it. It should be his first desire to ascertain this, and, having done so, to have the cesspool treated in a proper manner by ventilating it, and by severing it from the house drain by means of a disconnecting chamber with syphon and fresh air inlet. Fortunately these contrivances are now almost legion in number, but there are still many precautions to take, whatever pattern may be decided upon, and these will hereafter be figured and explained in sufficient detail.

If the residence is in a town or city and the

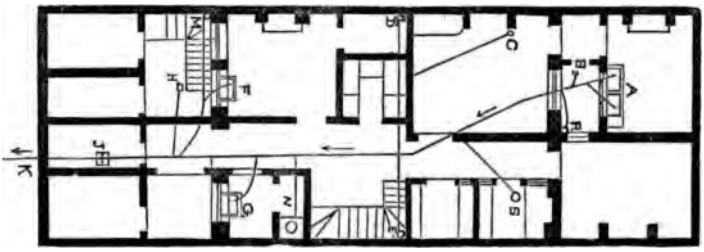

FIG. 1.

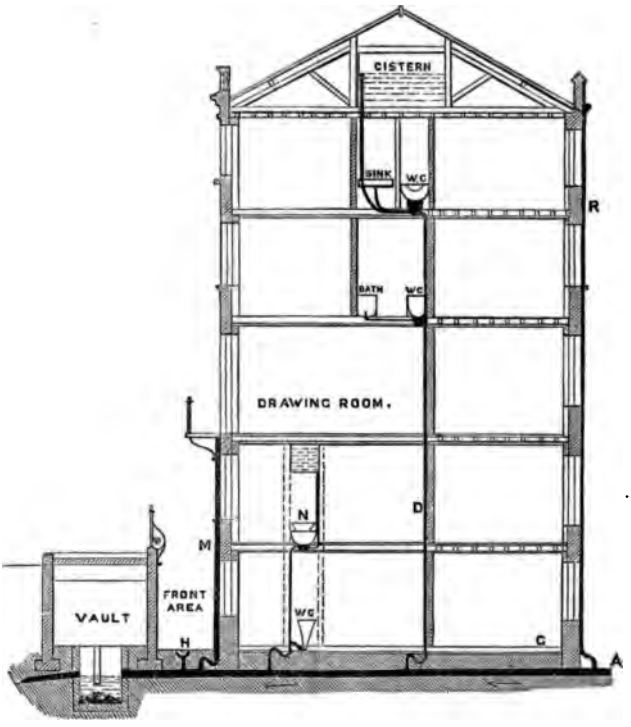

FIG. 2

§ 23. *Disconnection of House Drains from Sewers.*

The duties of an inspector of nuisances are, in truth, so very varied that it is necessary for him to be more or less perfectly acquainted with all the sanitary equipments of a residence and their several workings. If the residence is, for instance, in the country, where there is no sewer and the outfall is into a cesspool, and complaint is made of bad smells pervading the house, he will likely enough discover that the cesspool is unventilated, has never been emptied for years—if at all since it was built—

delivery be into a sewer, the disconnecting arrangement is still necessary if the house is to be properly treated, and although it is not yet made incumbent upon a builder to provide a disconnection between the house-drain and the sewer, nor upon the inspector to insist on one being provided, he should, nevertheless, be fully acquainted with its action, and able to explain the necessity of such disconnection to the occupier of the house. He will also find it very necessary to ascertain whether there is a flap-trap at the end of the drain where the latter joins the sewer.

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Having discovered and remedied a direct communication between the house-drain and the cesspool or sewer, his next desire should be to ascertain the condition of the house-drain, as to sufficiency of fall, soundness of the joints, and freedom from deposits, as it would be of no use to insert a disconnecting syphon in a drain which was faulty in any of the above respects. The methods of ascertaining the condition of the drain should therefore be within his knowledge, and he should be capable of directing the workmen how to proceed.

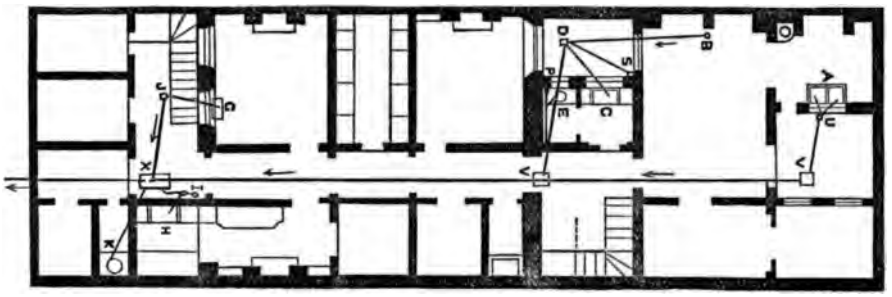

FIG. 3.

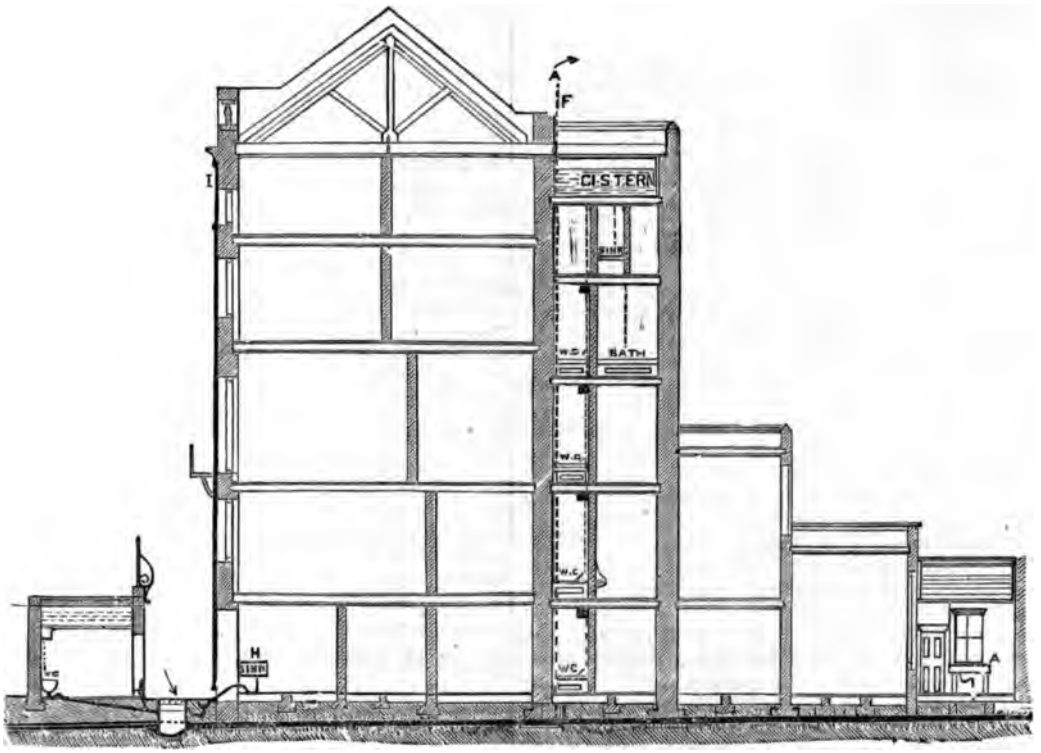

FIG. 4.

§ 24. *Soil and Waste Pipe.*

It very frequently happens that smells pervade a house, and the underground drains have nevertheless been found in passable condition. In all probability the soil-pipe will be to blame. The soil-pipe may be found to have a trap at the foot, and an air inlet syphon put in the house-drain without the workman having taken into account the necessity for the removal of such a trap in order to obtain a current of air through the drain. Or the inspector may discover that the soil-pipe is unventilated, which would also account for occasional foul smells. When the smell is persistent in the neighbourhood of the soil-pipe, he will likely enough discover that it has been eaten into holes by the foul gases from sewer or cesspool; and a ready means of ascertaining this, with the least expense, should be known to every inspector.

The chief cause of smells in a house—the drain and soil-pipe being found correctly treated and in good condition—will in all probability be discovered at the sinks. They may be found to have a direct communication with the drain, and ventilating the drain into the house, especially when the sewer is charged with a great quantity of storm water. The inspector should therefore be acquainted with a means of ascertaining whether there be a trap underground between the sink and the drain, or not, and, above all, he should be able to dictate what must be done to abate the nuisance. Mere disconnection would

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be sufficient in some cases. This would be easy to prescribe when the sinks are close to an open yard or area, but it becomes more difficult when such a near open space is wanting, and when the sink is in the centre of the house. The best means of compromising matters in such a case ought to be at his fingers' end, so to speak, and a knowledge of where risk ceases is here very essential. An inspector ought also to be able to say in what respects an upstairs sink fails to satisfy the requirements of health, what are improper methods of delivery, and how to remedy the evils.

There are also a number of points in connection with baths and lavatories which an inspector of nuisances should be well acquainted with, and it is often in the neighbourhood of these conveniences that foul smells make themselves manifest. Here, again, ordinary disconnection, if there be an easy chance of obtaining one, would suffice, but it sometimes happens that there are difficulties in the way, and these difficulties have to be met in a reasonable manner. Moreover, there are extra precautions beyond simple disconnection which are possible, and it is well to know in what these consist and when they are really advisable. Often enough, it is just as easy to provide these further precautions as to leave them out.

§ 25. *Rain-Water Pipes.*

When examining the rain-water pipes, there are also several complications of faulty delivery, which it is necessary to amend, and it will be necessary to take notice of these in due course, and point out the proper mode of dealing with these pipes. When they have been led down an outside wall and deliver the rain-water into a drain passing through an open yard or area, it is easy to deal with them in a safe manner. The difficulty is how to treat them when they descend, for instance, in the centre of the house. Something must then be done, because unless a rain-water pipe be disconnected at the foot, it oftener than otherwise ventilates the sewer and house-drain at a point very little above the upper bedroom windows and very frequently underneath the dormer lights.

It is still very common for builders, despite the outcry of common sense, to use the rain-water pipes as a descent for the soil from the closets, thus causing the rain-water pipe to perform double duty and rendering it almost impossible to disconnect the pipe at the foot. The inspector should be able to point out the reasons why this combination pipe is very undesirable in all cases, and especially dangerous under certain conditions. For just as the rain-water pipe, if communicating direct with the drain, may ventilate the drain at a dangerous level, the evils become still more possible when the rain-water pipe is made a means of conveying the closet soil to the drain. He should also be able to prove the insufficiency of merely trapping the foot of the pipe, and be able to demonstrate how sewer gas, as it is called, can be given off through the trapping water.

§ 26. *Water-Closets.*

Every inspector of nuisances will doubtless be conversant with the various kinds of closets, and be able to readily distinguish between an old Bramah valve apparatus, a valve closet of modern pattern, a pan-closet with its huge container, a hopper pattern apparatus, and what is now generally called a wash-out closet, because he can see these in nearly every plumber's window. But this is not sufficient to qualify him to decide many faults which may present themselves to him during a close inspection of a large, or even a moderately sized, residence. He should be cognisant of all the errors made wilfully by the builder to save expense, and of the blunders made by incompetent workmen—the treatment of the safe or tray under the closet apparatus, for example. And a wise inspector, seeking to improve himself in every way, should, on all occasions, when improper entries present themselves, be able to sketch these in his note-book for future reference.

It is, moreover, not only necessary for an inspector to be able to point out the faults of a closet, but he should be competent, as well, to deal during his examination with the entire belongings of the closet. For instance, he should be able to say whether the flushing power is sufficiently ample, under what conditions the closet connects directly with a cistern, and why it is dangerous to drink water from a cistern which supplies a closet, with wire and lever, or even when the supply to the closet is through a modern valve. It is here that many lamentable faults of omission are committed by some inspectors, forgetful or ignorant that their examination should extend not only to the drainage proper of a house, but to everything in connection with such drainage. A cistern which has its standing waste or overflow pipe leading into the closet trap, or into the soil-pipe, or combined rain-water pipe and soil-pipe, becomes in that case as much a part of the drainage system as the underground drain itself. The inspector's knowledge should enable him to decide what to do under all circumstances, and he ought to be able to point out the readiest and most useful methods of remedying each evil.

§ 27. *Floor-Traps.*

Then there is the question of floor-traps, or entries into the drain system inside a house. Such entries are often found at the kitchen jamb, for the drippings of the hot-water tap, under scullery sinks, in larders, washhouses, and passages, for the purpose of taking away the water which has been used during the scrubbing of the floors. Where have these been injudiciously and even dangerously placed, and under what conditions may they be permitted to remain? These entries into the drain have all carefully to be considered, as an immense amount of mischief has accrued from them, and it should be one of the first matters of exploration when examining a house. For if a floor-trap be wrongly treated, the immediate neighbourhood will smell most offensively, and wherever there is a smell there is a corresponding amount of danger.

§ 28. *Bad and Good Drainage Illustratea.*

It may serve a good purpose before entering into separate details to take a comprehensive view of the matter, and compare an unsanitary house with a sanitary one.

Fig. 1 represents the plan, somewhat lengthened, of a dwelling situated in a street where exterior drainage was impossible, and although, despite of this, the house might have been made a healthy one, everything had been done in the contrary direction through ignorance. The underground drain from the scullery sink A is laid without sufficient fall, is not surrounded by concrete, and the trap between the house drain and the sewer placed at J in the front area vault is of the cesspool order shown in the section (fig. 2). The butler's sink G and house-

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keeper's room sink F both deliver direct into the drain, as shown, and without disconnection of any kind. The rain-water pipe E and that at M do the same, the former ventilating the drain and sometimes the sewer, in the first case level with the top bedroom window, and the latter almost direct into the drawing-room. The front area surface-trap at H also discharges over a bell-trap, and, worse than this, there are two floor-traps inside: one at the kitchen fire jamb at C, and one in the floor of the larder at S, which both connect directly with the drain and act as ventilators to the drain when the trapping water has dried up or the bell covers have been removed.

The treatment of the closets in this example is also objectionable on every ground. The servants' apparatus at N is placed inside the house, and is of the long hopper pattern, difficult to keep clean. The two uppermost closets are pan closets, and these deliver into an unventilated soil pipe, as does also the ground-floor closet at D. The delivery of the housemaid's sink on the topmost floor is into the trap of the adjoining closet, and the bath delivers equally improperly and dangerously into the closet opposite it. There is, moreover, no pure water supply for the dwelling, as the upper cistern in the roof supplies the two upper closets, as well as the kitchen, and the draw-off tap on the top floor, and the cistern over the ground-floor closet—supplying that closet and the servants' convenience below—supplies the basement sinks F and G as well. The waste pipes of the two cisterns also deliver into the closet traps. There are several other departures from sound sanitary rule, not the least being that the basement paving is simply laid upon the bare earth.

Let us take now the case of a house which is very fairly treated in respect of its drainage, and where all has been that could well be done, considering that the drains must perforce run through the house (see figs. 3 and 4).

In this case the drains have been laid with a sufficient fall towards the sewer, surrounded by concrete, and a proper disconnection system has been introduced at X in the front area, with a fresh air inlet. The drains have also been laid in straight lines with inspection manholes at V V. At D in the small central open yard has been placed a gulley, and into this is received, in disconnected fashion, the waste of the lavatory C, the drip from the kitchen jamb B, the bath waste descending the pipe S, and the surface water of the yard. The surface water gulley in the front area at J receives the waste from the house-keeper's room sink at G before being taken into the disconnection chamber, and the other sink and rain-water pipes H and I are treated in a similar manner, as will be seen on the contracted plan, fig. 3. The scullery sink A in this case delivers into an open trap U in the back yard.

As regards the closets, a servant's wash-out apparatus has been fixed in a front vault at K, with suitable flushing arrangement requiring only a touch of the chain to release its contents, and the closet also delivers into the disconnection chamber.

The house closets have been placed in a wing building, and the cistern at the top of the house, shown in section fig. 4, supplies nothing but flushing water to the closets. The housemaid's sink and the kitchen boiler are supplied from an adjoining cistern, with a partition between them, and the cistern overflows are into the open air. Above all, the soil-pipe Y is outside the house and is ventilated to above the parapet, as shown on the section. The rain-water down-pipes are disconnected at the foot, as may be seen in the front area in the section. Nothing delivers directly into the house-drain except solely the soil-pipe; all else is disconnected. The basement flooring also rests upon sleeper walls and not upon cold earth.

(*To be continued.*)

A FEW HINTS AS TO WHAT TO DO IN CASE CHOLERA VISITS ENGLAND.

By W. DAWSON TURNER, M.A.

AT the present time, when a visitation of cholera is certainly a possibility, I shall be doing, I think, a public service by calling attention to a few simple and easy precautions, within the power of every, or nearly every, man or woman of intelligence to take, in case this terrible disease visits England. I will endeavour to be as brief as I possibly can, and will only premise that I was in Alexandria in the years 1865 or 1866, when the cholera was at its height and all business in the town was suspended, and that I had the good fortune to meet, and have a conversation with, the physician at the head of the English hospital there, and to profit by his instruction.

1. Though this is a matter of common course at at all times, keep your dustbins and middens as sweet and clean as circumstances will admit. No throwing of decaying vegetable matter, still less of animal matter, into them by the cook, or the kitchen maid, and then hiding them with a sprinkling of dust and ashes—'Quo semel est imbuta recens servabit odorem Texta diu,' the plain English of which is, 'the stench will come through,' and very likely, if sufficiently malodorous, give you, or your children, or your servants, that terrible complaint, 'pyæmia,' that is, blood-poisoning; if it does not help as handmaid to the cholera.

Also, under this head, flush your drains, sinks, and sewers with carbolic acid, or with Condy's fluid, from time to time, and do not be sparing in their use: they are cheap enough, and anything is cheaper than being ill.

2. Do not indulge too much in fruit, especially not in stone-fruit, if cholera, or even diarrhœa, be much about; and let whatever fruit you do eat be neither hard and unripe, nor tainted and decayed. The hard, half-ripe plums of Gibraltar and Malta, greedily devoured by the foolish English soldier, bear the very apposite name of 'Kill John.'

3. Decidedly abstain from beer at your dinner, especially from the adulterated stuff sold as such at London pot-houses. It is best to keep off all alcohol together for a time, and to put yourself on the temperance diet of milk or eau-sucré at your dinner. If you are taking no meat at your meal, then you may take as much tea, cold or hot, as you like at your meals; better without milk and sugar than with; but do not drink tea if you are eating meat at the time. The tannin that tea contains is likely to interfere with the action of the gastric juice in digestion of the meat.

4. At your dinner let your main vegetable be rice. In fact, you had better take rice, boiled or baked, at every meal, in case cholera visits us. This cannot be too strongly urged. The English physician of the hospital at Alexandria, to whom I have already referred, told me that he not only put all his patients who were capable of swallowing on a rice diet, but that he urged on all over whom he had any in-

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fluence for the time, even while still quite well, to put themselves on that diet.

5. Unless you are an exception to the general rule, and are possessed of, and blessed with, the *dura messorum ilia—i.e.* the stomach of an ostrich—do not take coffee (waive chicory!) at your breakfast, but rather tea, and without milk, better than with it. The practice of that queen or empress of nursing, Miss Florence Nightingale, in supplying the sick and suffering soldiers with buckets of cold tea, when they came down from 'the front,' was not thrown away upon us when we were at Balaclava in 1855.

6. Lastly, take especial care, in case the cholera comes among us, to attend to the attack of diarrhœa, which is, I believe, the invariable forerunner of cholera. Do not 'lay the' foolish 'flattering unction to your soul' that the diarrhœa will get well of itself: it will do nothing of the kind. Go, if you have any sense, and if you can afford to pay him, to the best qualified medical man you know or can hear of; and if for any reason you cannot do that, then copy out one or other of the following recipes. Take it to any respectable chemist; get it made up, six to twelve doses of it; and take it three times a day, and lie still during the day. Anyway, do not keep moving about, if you wish it to do you any good. Have a quiet mind; read some sensible amusing book while lying still; put your trust in God, and hope for the best. There is a good deal of truth in the old Spanish proverb, 'El medico lleva la plata, pero es Dios que lo sana.'

Prescriptions for diarrhœa, in case no qualified doctor can be had:—

1. ℞. Rhubarb, in fine powder, 20 grains; aromatic powder of chalk, 20 grains; pimento draught, 1½ fluid ounces. Mix.

Or else

2. ℞. Diluted sulphuric acid, 20 drops; laudanum, 10 drops; spirits of chloroform, 20 drops; cinnamon water, 1 fluid ounce. Mix.

Each of the above prescriptions is for one dose only. Get six to twelve doses made up, and take the mixture three times a day.

N.B.—Do not take the two mixtures together or mix them. If the first does not seem to do you much good within a day or two, then give it up, and take the second instead.

THE LOVE OF STIMULANTS.—At a recent meeting of the South Dublin guardians, the medical officer reported that he had directed that eight pounds of snuff should be served out to the inmates. A guardian observed that he was glad of this, because the old women took ashes when they could not get snuff, and this injured their health. The old men ground up stones and mixed them with clay for the same purpose.

ANALYSES IN GERMANY.—The Berlin police pay for chemical investigation of the following substances the rates quoted below, namely:—Six marks (nearly six shillings) for butter; three marks for tea; two marks for meal, bread, groats, chicory, chocolate, mustard, plum conserve, or tobacco; one and a half mark for spices; one mark for coffee, cheese, seltzer water, or fruit juices, and half mark for sugar.

MR. PETER SPENCE, to whose experiments and inventions practical chemistry owes much of its modern development, has died at Manchester at the age of seventy-seven. He discovered the process of the extraction of alum from the refuse shale of collieries and the waste ammoniacal liquor of gas works, which revolutionised the trade, the cost of production being permanently reduced by 40 per cent.

THE REGISTRAR-GENERAL'S LAST QUARTERLY RETURN.

By J. HAMPDEN SHOVELLER.

THE Registrar-General has just issued his usual quarterly return of marriages, births, and deaths in England and Wales. The statistics relating to marriages are for the three months ending March 31 last, and those for births and deaths for the second quarter of this year, ending June 30. The marriages showed a further increase upon those recorded in recent quarters; the births, however, though they showed a slight increase in numbers, were fewer in proportion to population than in recent corresponding quarters. The mortality was in excess of that recorded in the second or spring quarter of either of the two preceding years, but was below the average.

The marriages of 87,830 persons were registered in England and Wales during the first three months of 1883, equal to an annual rate of 13·3 per 1,000 of the estimated population. This marriage-rate showed a considerable increase upon that recorded in the same quarter of 1882, and exceeded the rate in the corresponding period of any year since 1876.

During the three months ending June 30 last, 228,703 births were registered in England and Wales, which were equal to an annual rate of 34·3 per 1,000 of the population in the middle of this year, estimated at twenty-six and three-quarter millions of persons; this birth-rate showed a further decline from the rates recorded in recent corresponding quarters, and was 1·6 below the average rate in the corresponding quarter of the ten years 1873–82. The birth-rates in the several counties ranged from 27·8 in Herefordshire, 28·8 in Devonshire, and 29·1 in Dorsetshire, to 38·9 in Nottinghamshire, 39·2 in Staffordshire, and 40·7 in Durham.

The natural increase of the population of England and Wales, or the excess of births over deaths, was last quarter 94,920. From the Board of Trade returns it appears that 174,282 emigrants embarked during last quarter from the various ports of the United Kingdom at which emigration officers are stationed. After distributing proportionally 598 whose nationality was undistinguished, and excluding 39,575 foreigners, the emigrants of British origin were 134,707, including 60,198 English, 11,781 Scotch, and 62,728 Irish. The proportions of British emigrants last quarter to a million of the respective populations of the three divisions of the United Kingdom were 2,249 from England, 3,079 from Scotland, and 12,440 from Ireland. Compared with the corresponding period of 1882, the proportion of emigrants from England and Scotland differed but slightly, whereas it showed a very large increase from Ireland.

From returns furnished by the Local Government Board, it appears that the average number of paupers relieved on the last day of each week in the quarter ending June last was 710,353, of whom 172,858 received indoor, and 537,495 outdoor, relief. Compared with the corresponding quarter of 1882, the proportion of pauperism in the three months under notice showed a slight decline.

During the second quarter of 1883 the deaths registered in England and Wales were 133,783, equal to an annual rate of 20·1 per 1,000 of the estimated population, which was 0·3 below the average rate in the corresponding period of the ten years 1873–82,

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although it exceeded by 1·5 and 1·1 per 1,000, respectively, the exceptionally low rates recorded in the second quarters of 1881 and 1882. This increase in the death-rate was probably due to the unseasonably cold weather that prevailed during March. In the various counties the death-rates ranged from 15·9 in the extra-metropolitan portion of Surrey, and 16·8 in Rutlandshire, to 22·6 in Huntingdonshire, and 23·5 in Monmouthshire. In the urban registration districts and sub-districts, comprising the chief towns, and containing an estimated population of rather more than sixteen millions of persons, the annual death-rate in the last quarter was equal to 20·8 per 1,000; while in the remaining or chiefly rural population of ten and a half millions of persons, the rate did not exceed 19·0. The urban rate was slightly below, while the rural rate corresponded with, the average rate in the ten preceding June quarters.

In twenty-eight of the largest English towns, including London, and having an estimated population of more than eight and a half millions of persons, the death-rate averaged 21·5, and exceeded the general urban rate by only 0·7. While the rate did not exceed 20·5 in London, it averaged 22·3 in the twenty-seven provincial towns, among which it ranged from 17·4 and 17·8 in Bristol and Bradford, to 25·7 in Hull, 26·6 in Liverpool, and 27·5 in Manchester. In estimating the value of these general death-rates as a test of sanitary condition, it should be noted that the annual death-rate from the principal zymotic diseases in these towns last quarter ranged from 0·57 in Huddersfield to 4·45 in Liverpool; that the proportion of deaths under one year of age to 1,000 births was only 96 in Brighton, whereas it was 174 in Huddersfield; that among persons aged between one and sixty years the death-rate at these ages ranged from 9·8 in Bristol and in Leicester to 18·5 in Manchester; and that among persons aged upwards of sixty years the death-rate was but 65·1 in Norwich, whereas it was 99·0 in Huddersfield.

The 133,783 deaths last quarter in England and Wales included 28,802 of infants under one year of age; 68,425 of children and adults aged between one and sixty years; and 42,287 of persons aged upwards of sixty years. Infant mortality, measured by the proportion of deaths under one year of age to births, was equal to 126 per 1,000, and was slightly below the average of the ten preceding corresponding quarters. In the twenty-eight great towns the proportion averaged 136 per 1,000; while the rate did not exceed 128 in London, it averaged 142 in the twenty-seven provincial towns, ranging from 96 and 112 in Brighton and Bristol, to 168 and 174 in Hull and in Huddersfield. The rate of mortality in England and Wales among persons aged between one and sixty years, and also among persons aged upwards of sixty years, was slightly above the average.

The deaths registered in England and Wales last quarter included 2,815 which were referred to whooping-cough, 2,582 to measles, 2,452 to scarlet fever, 1,905 to diarrhœa, 1,793 to fever, 861 to diphtheria, and 224 to small-pox; in all, 12,632 deaths resulted from these zymotic diseases, equal to an annual rate of 1·89 per 1,000, which was 0·51 below the average rate in the ten preceding corresponding quarters. In the twenty-eight great towns this zymotic rate averaged 2·28 per 1,000 last quarter, and ranged from 0·57 and 0·67 in Huddersfield and Norwich, to 4·01 in Sheffield, and 4·45 in Liver-

Analysis of the Vital and Mortal Statistics of the Twenty-eight Great Towns, dealt with in the Registrar-General's Weekly Returns for the Second Quarter of 1883.

Towns.	Estimated Population middle of 1883.	Births.	Deaths.	Annual Rate per 1,000 Living.			Deaths from Principal Zymotic Diseases.	Small-pox.	Measles.	Scarlet Fever.	Diphtheria.	Whooping-cough.	Fever.	Diarrhœa.	Rate per cent of Uncertified Deaths.	Deaths of Children under one year of age to 1,000 Births.
				Births.	Deaths.	Principal Zymotic Diseases.										
28 Towns	8,620,975	75,697	46,082	35·2	21·5	2·3	4,903	81	1,267	931	298	1,057	603	666	2·6	136
27 Towns	4,665,161	41,960	25,895	36·1	22·3	2·3	2,662	54	472	606	78	654	426	372	3·7	142
London	3,955,814	33,737	20,187	34·2	20·5	2·3	2,241	27	795	325	220	403	177	294	1·1	128
Brighton	111,262	853	499	30·8	18·0	0·9	25	—	1	2	1	6	12	3	2·6	96
Portsmouth	131,478	1,157	616	35·3	18·8	2·6	85	—	2	3	4	26	34	16	0·5	131
Norwich	89,612	783	439	35·1	19·7	0·7	15	—	—	1	1	4	3	6	2·7	117
Plymouth	74,977	564	389	30·2	20·8	2·1	40	—	7	—	2	24	5	2	1·5	122
Bristol	212,779	1,755	925	33·1	17·4	1·0	55	—	14	6	2	10	7	16	2·8	112
Wolverhampton	77,557	729	410	37·7	21·2	1·4	27	2	—	11	—	5	5	4	5·4	126
Birmingham	414,846	3,810	2,164	36·9	20·9	2·0	202	9	20	64	14	43	17	35	1·2	139
Leicester	129,483	1,256	616	38·9	19·1	1·5	49	—	6	16	—	21	2	4	2·8	147
Nottingham	199,349	2,050	1,019	41·5	20·7	1·4	72	—	2	6	5	18	21	19	2·0	126
Derby	85,574	768	418	36·0	19·6	1·2	25	—	—	7	1	10	5	2	2·9	138
Birkenhead	88,700	796	432	36·0	19·5	1·3	29	—	4	7	—	8	9	1	2·3	137
Liverpool	566,753	5,130	3,762	36·3	26·6	4·5	629	5	225	78	14	120	123	64	5·5	165
Bolton	107,862	970	522	36·1	19·4	1·5	39	—	1	2	1	12	8	15	2·3	148
Manchester	339,252	3,116	2,325	36·9	27·5	2·9	241	1	54	41	4	86	23	32	2·4	150
Salford	190,465	1,731	981	36·5	20·7	1·4	68	—	14	7	3	21	11	12	5·4	139
Oldham	119,071	1,055	694	35·6	23·4	1·2	35	—	2	7	1	11	5	9	6·2	145
Blackburn	108,460	1,095	684	40·5	25·3	1·6	44	—	—	8	—	10	17	9	2·8	160
Preston	98,564	947	581	38·6	23·7	1·9	46	—	—	10	3	4	8	21	6·0	161
Huddersfield	84,701	585	498	27·7	23·6	0·6	12	—	2	1	—	3	1	5	4·2	174
Halifax	75,591	568	389	30·2	20·7	1·0	18	—	—	5	—	2	6	5	9·8	136
Bradford	204,807	1,545	910	30·3	17·8	1·2	63	—	3	7	1	26	8	18	4·1	121
Leeds	321,611	2,827	1,751	35·3	21·9	2·5	197	8	2	111	6	30	18	22	3·8	130
Sheffield	295,497	2,690	1,746	36·5	23·7	4·0	295	—	69	149	4	35	19	19	3·8	147
Hull	176,296	1,700	1,128	38·7	25·7	3·3	146	3	1	28	2	85	15	12	6·1	168
Sunderland	121,117	1,277	663	42·3	22·0	1·6	49	2	3	10	1	4	23	6	5·0	121
Newcastle-on-Tyne	149,464	1,342	868	36·0	23·3	3·1	117	23	40	15	2	9	16	12	2·8	145
Cardiff	90,033	861	456	38·4	20·3	1·7	39	1	—	4	6	21	4	3	1·5	145

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pool. In fifty other large towns this rate averaged 2·01, and in the remaining or rural portion of the country it did not exceed 1·66.

As in the first quarter of the present year, whooping-cough was the most fatal zymotic disease in England and Wales during the three months under notice. The 2,815 deaths referred to this disease were equal to an annual rate of 0·42 per 1,000, which was 0·12 per 1,000 below the average rate in the ten preceding corresponding quarters. In the twenty-eight towns the death-rate from whooping-cough averaged 0·49, and ranged from 0·11 and 0·13 in Halifax and Sunderland, to 1·28 in Plymouth, and 1·94 in Hull. In the fifty other towns the rate averaged 0·42, and was equal to 1·61 in Stockport, and 2·10 in Burton-upon-Trent. The 2,582 deaths from measles were equal to an annual rate of 0·39 per 1,000, which was slightly below the average rate in the ten preceding June quarters. In the twenty eight great towns the highest measles death-rates were 0·94 in Sheffield, 1·07 in Newcastle-upon-Tyne, and 1·59 in Liverpool; and among the fifty large towns the rates ranged upwards to 2·35 in Ystradyfodwg, and 5·97 in Southampton. The fatal cases of scarlet fever were 2,452, equal to an annual rate of 0·37 per 1,000, which was as much as 0·17 below the average rate. The highest scarlet fever rates in the twenty-eight great towns were 1·39 in Leeds and 2·02 in Sheffield, and in the fifty large towns 1·00 in Warrington and 1·41 in Rotherham. The deaths from diarrhœa were considerably below the average. The fatality of fever, principally enteric, was also much below the average of recent corresponding quarters; the annual death-rate last quarter from this disease, however, which did not exceed 0·27 in the whole of England and Wales, was equal to 0·76 in Sunderland, 0·87 in Liverpool, 1·04 in Portsmouth, and 1·24 in Barrow-in-Furness. The rate of mortality from diphtheria was 0·13 per 1,000, and exceeded the average; it was equal to 0·22 in London, 0·27 in Cardiff, 0·39 in Shrewsbury, and 0·43 in Reading. Of the 224 fatal cases of small-pox in England and Wales last quarter 30 occurred in London and its outer ring of suburban districts, 51 in Staffordshire (including 18 in West Bromwich), 13 in Lancashire, 45 in Durham, 23 in Newcastle-upon-Tyne, 9 in Birmingham, and 8 in Leeds.

The causes of 121,562, or 90·8 per cent. of the total deaths in England and Wales last quarter were certified by registered medical practitioners, and 6,918 or 5·2 per cent. by coroners. The remaining 5,303, or 4·0 per cent. were uncertified. In London the proportion of uncertified deaths was only 1·1 per cent., whereas in the rest of England and Wales it averaged 4·5 per cent. In the twenty-eight great towns the proportion of uncertified deaths was 2·6 per cent., and ranged from 0·5 and 1·2 in Portsmouth and Birmingham, to 6·2 in Oldham and 9·8 in Halifax.

THE Metropolitan Board of Works, in carrying out their improvements in Whitecross Street, St. Luke's, had a small plot of land left, about 1,300 feet, which the Vestry of St. Luke's has just purchased for the sum of 500*l.*, being at the rate of 7*s.* 6*d.* per foot, for the purpose of improving their mortuary in Warwick Place, Whitecross Street.

FROM a report just presented to the Clerkenwell Vestry it appears that the net cost of the system of doing the dusting, slopping, and watering of the parish by the vestry's staff has been this year 250*l.* below the average for the past six years, when the work was carried out by the contractors.

THE VENTILATION OF SEWERS AND HOUSE-DRAINS.*

By RICHARD READ,

Assoc. M. Inst. C.E., City Surveyor, Gloucester.

THE water-carriage system of sewerage may be said to have been fairly inaugurated by the Public Health Act of 1848, and although epidemics were of frequent occurrence during the ten or twelve years immediately following, the majority of scientific men took but a very feeble interest in the unsavoury subject of sanitary science until the death of the Prince Consort in 1861; this set everyone to work to discover a remedy for fever epidemics, which doctors and chemists plainly stated were probably caused, and certainly spread, by defective sanitary arrangements.

A perfect shoal of patent traps and closets were brought out, all warranted to keep back the much-dreaded sewer-gas, but notwithstanding these, and the timid trial of ventilation, with many precautions in the shape of charcoal-trays and other obstructions, the public were again startled by the illness of the Prince of Wales in 1871. A fresh crop of patent apparatus followed, to the great bewilderment of those whose faith in the magic word 'patent' caused them to take the statements of inventors or patentees without the necessary grain of salt. Ventilation in the meantime progressed quietly and steadily, until it has now become the recognised practice to place ventilators from 50 to 100 yards apart upon all new sewers.

In a period of forty years the sewers of a town pass through many stages of alteration and development, and it frequently happens that existing sewers are partially retained and become portions of a new system; this may be all right if the old sewers are in good condition, and are laid in the public streets, where they can be examined, flushed, and ventilated by the sanitary authority, but when they are at the backs of houses, crossing private gardens belonging to many owners, and are not ventilated, they become a serious cause of evil.

An arrangement of this kind was unfortunately carried out in Gloucester in 1875, after the extension of the city boundaries to take in several outlying parishes, whose sewers discharged into an open brook. It will be easily understood that the ventilation of the new sewers in the public streets at every 60 yards caused a very great nuisance to arise, the long pent up gas from the old sewers finding free exit from the vents in the new ones as soon as the two were connected.

To allay the fears of the public, charcoal pans were placed in the ventilators, contrary to the advice of the engineer; the nuisance in the streets was thus abated, but as the pans were practically nothing but stoppers the real sanitary condition of the town was rather worse than before. The writer was called upon, soon after his appointment in 1878, to report upon this state of things, and being then ignorant of the existence of a dual system, recommended free flushing, to be followed by more ventilation; accordingly, during the winter the charcoal pans were removed, and 100 manholes in the old part of the city ventilated, but a return of warm weather brought with it a recurrence of the nuisance, which no amount of flushing in the new sewers could abate.

* Read at the Lancashire and Cheshire District meeting of the Association of Municipal and Sanitary Engineers.

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A thorough investigation revealed the fact that the old sewers were all 'picked up' by the new wherever they crossed each other, and the mystery was at once explained. No doubt this was intended as a temporary measure, to give the owners of property time to transfer their house-drains from the old sewers at the back to the new in the front, but with the result that there are still 1,200 houses connected with the old sewers, thus preventing the latter being closed.

This point has been dwelt upon somewhat fully, because it is quite possible that something of the kind is of not unfrequent occurrence. A consulting engineer designs a system of sewers for a provincial town, which of necessity must have some existing system, however bad it may be; a contractor from a distance carries out the work, but the local authorities to keep down the rates, or for some other reason, leave the transfer of the house-drains from the old system to the new to be carried out by the owners of property at their leisure or discretion, which means that unless the house-drains stop altogether nothing is done, for the majority of owners of house property neither know nor care where the drains go to as long as the water runs off and they can get their rents.

Sewer-gas is almost universally dreaded as a highly deleterious compound, but our knowledge of its actual composition and action is by no means extensive nor final. The following table shows the names and specific gravities, compared with hydrogen and atmospheric air, of a number of gases given by several eminent authorities as component parts of sewer-gas :—

Gas.	Specific Gravity.
Hydrogen	1·00
Atmospheric air	14·25
Sulphuretted hydrogen	17·00
Carburetted	8·00
Olefiant gas	13·00
Ammonia	8·50
Carbonic acid	22·00
Nitrogen	13·85
Sulphurous acid	32·00
Bisulphide of carbon	38·00
Chlorine	35·50
Watery vapour	9·00

The whole of these are not always present, but the heavier gases as a rule predominate, such as sulphuretted hydrogen, nitrogen, and carbonic acid. The question therefore suggests itself, Why does sewer-gas rise from the sewers, notwithstanding its components are heavier than the air? This is caused—1st, by pressure upon, or displacement of the gas by reason of an increased flow of sewage; 2ndly, by diffusion and natural expansion of the gas itself; and 3rdly, and most commonly, by being absorbed or entangled by the light watery vapour constantly arising from the sewage, which acts as a vehicle to carry it out of the sewers. The first is merely mechanical displacement, but the second and third methods are caused by variations of pressure and temperature of the outer air as compared with that of the sewage.

The temperature of sewage in the sewers varies from 40° F. in winter to about 60° in summer; that of the atmosphere at the ground level from several degrees below freezing point in winter to 80° in the shade in summer, but the temperature of sewage will not vary more than 3° in the twelve hours of a summer day, while that of the atmosphere will vary 6°, 10°, or even 20° in the same time, and in summer is always warmer than the sewage. These differences of temperature are accompanied by constant variations of atmospheric pressure causing the gases to expand and watery vapour to arise from the sewage, this vapour, being lighter than the air, carries the gas out at the street ventilators; this action is particularly apparent during a spell of dry weather, when the sewage is in its most concentrated form and evaporation is most active. The action is intensified when a sudden fall of the barometer indicates the near approach of a storm; the expansion of gas is then sufficient to carry it out of the ventilators without the aid of the watery vapour as a vehicle, and therefore it is discharged under our noses in its most offensive and undiluted form. But even when mixed with watery vapour the latter expands so rapidly upon reaching the outer air that the heavier gas is left to fall to the ground if there is not sufficient wind to disperse both before the separation takes place.

In winter, when decomposition is at its minimum, and consequently little or no gas is generated, the watery vapour predominates, and if the outer air is colder than the sewage the vapour is sufficiently condensed to become visible, rising like smoke from the ventilators on a frosty morning; it is then, however, quite harmless, from the absence of decomposition.

The above is the action of a system of sewers having the outfall below low-water mark, and ventilated as at Gloucester by open grids 36 square inches in area at every 60 yards along the public streets; this is so because the difference of level between two ventilators at that distance apart is not sufficient to convert the lower one into a downcast shaft and the upper one into an upcast shaft, but the action is simply a slow respiratory one, due to the expansion and contraction of gases and watery vapour, overflowing or not from the ventilators in response to the atmospheric changes above mentioned. But no system of ventilation can be efficient that does not establish a constant current of air through the sewers and house-drains of sufficient strength to prevent a reversal of direction under all ordinary variations of the atmosphere; nevertheless, we do not want to produce, or even stimulate, a general tendency or rush of gas to the higher branches of a system of sewers, or to any one point in a town, but on the contrary the object of ventilation is, or should be, to prevent the accumulation of gas by passing a free current of air through both the sewers and house-drains.

To prevent this accumulation of gas, ventilation alone must not be relied upon, if the sewers themselves are in any way defective, or a nuisance will be the result, and although it is better to have the gas discharged into the open air than into private houses, it is difficult to convince the general public of the utility of any system of ventilation that emits a stink into the streets; for defective sewers there is an obvious remedy, therefore ventilation, to be successful, should be applied to well-constructed sewers with gradients sufficient to keep them free from deposit.

In such a system of sewers the sewage passes off before decomposition sets in, and it is only the vapour from fresh sewage we have to deal with by ventilation. This vapour should not be discharged in its crude state at the street grids, but the latter should be converted into inlets for air, the outlets for the oxidised vapour being above the roofs of the

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houses, some thirty feet or more above the street level.

In order to establish the current of air entering downwards at every street grid, it is necessary that the ventilating shafts fixed against gable ends or other convenient walls of the house should be so numerous that the sum of their sectional areas should exceed that of the two street vents between which they are placed, sufficiently to overcome the friction of the air through the pipes; these should be not less than 4 inches in diameter, and may be either independent connections with the sewer, or simply the continuation of the house-drains.

In a distance of 60 yards we may have, say, twelve houses in close order on each side of the street, or we may have, say, eight semi-detached houses on each side in the same distance, so that, at the lowest estimate, we shall have sixteen soil-pipes 4 inches diameter, or about 12½ square inches sectional area each, that can be converted into ventilation outlets, or a total of 200 square inches of outlets sucking away at 72 square inches of inlets.

But the property owner asks at once, Why should I help to ventilate the public sewers? The answer to this is, that the sewers are laid down for the benefit of the houses draining into them, and therefore those who use the sewers should also help to ventilate them and thus complete their efficiency, by simply ventilating their own house-drains; that is to say, the sewers and house-drains should be treated as parts of the same system, as mutually dependent upon each other as a man's hand and fingers. In detached or semi-detached houses, where the drains can be kept outside, there is no reason why the soil-pipes should not be continued 4 inches diameter up above the roof as a ventilator, but with houses in close rank there may be some risk, although there should not necessarily be a great deal if the sewers and house-drains be properly constructed, in passing drains under the houses; in this case, therefore, it is safer to ventilate the house-drains independently, and have special ventilation for the sewers in addition, although such a proceeding doubles the expense.

If these conditions could be obtained, and there ought to be very little difficulty about it, there would be no necessity for any complicated closet apparatus but a simple pan and syphon trap, such as the 'Artisan,' now made by several makers, is all that is necessary, provided always that they have a good flushing rim discharging the water from all sides straight into the syphon; the flushing-box should never be less than 6 feet above the seat, and have not less than 1¼ inch flush pipe.

In conclusion, notwithstanding the almost universal condemnation of the pan and container closet, about which Mr. Pridgin Teale quotes from 'Scribner's Magazine' of New York that 'it probably is not, but it certainly might be, the invention of the devil,' they are still to be found in the majority of indoor closets, and are even now fixed daily by builders and plumbers who must or ought to know their defects.

DURING this season above 400 London orphan children have been received at the Dover Orphans' Rest, the children having derived great benefit from their sojourn on the sea-coast. The home, we are informed, was only established last year, and has been so much in request that it has been found necessary to hire additional premises in order to provide sufficient accommodation for the candidates for admission.

THE

SANITARY RECORD.

SEPTEMBER 15, 1883.

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The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

NEW ACTS OF PARLIAMENT.

FOLLOWING our customary plan, we give below an abstract of the Acts affecting sanitary interests which have been passed during the last session of Parliament. There seemed at one time* a prospect of a considerable amount of useful sanitary legislation being added to the Statute Book this year; for a Bill for the better Municipal Government of London was promised by the Home Secretary; a County Boards Bill was also talked of for the sixth or seventh year in succession; and Mr. Dodson was preparing for the re-introduction of the Rivers Conservancy Bill of 1879. None of these Bills, however, took any coherent shape; and of the other Government Bills, the Burgh Police and Health Bill for Scotland was withdrawn owing to the opposition of the Scotch municipalities and the comprehensiveness of the measure itself; the Local Government Board (Scotland) Bill, designed to reorganise and strengthen in Parliament the central public health administration of Scotland, was thrown out by the Lords; and the Medical Act Amendment Bill had perforce to be dropped because of the impossibility of reaching it before the last day or two of the session.

For the failure of these measures the Government can perhaps hardly be held responsible; though the uncertain attitude which they assumed when Mr. Stansfeld's motion as to the Contagious Diseases Acts came up for discussion undoubtedly turned the scale against those Acts. The Public Health (Dairies) Bill might undoubtedly have been passed with the exercise of a little foresight and perseverance, as the opposition to it was purely nominal; and the rectification of a serious administrative blunder must now be deferred for another year.

Of Bills introduced by private members, the Canal Boats Act Amendment Bill of Mr. Broadhurst was swallowed up by the Select Committee sitting on the larger question of the utilisation of canals as carriers of freight; Mr. Anderson's Cruelty to Animals Bill was thrown out by the Lords; Mr. Morley's Bill as to the Disqualification of Members of Local Boards had to be dropped for lack of time to discuss it; Mr. Hastings' Bill for the Compulsory Notification of Infectious Diseases was counted out on a Wednesday afternoon; and Mr. Reid's Bill for the Abolition of Vivisection was only saved from ignominious defeat by being talked out on another Wednesday afternoon.

The measures that remain are not numerous, nor (with one exception) important.

The *Diseases Prevention (Metropolis) Act* (passed Aug. 20) was brought in when the outbreak of

* See SANITARY RECORD, Vol. XIV., p. 302.

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cholera in Egypt had given rise to fears of its possible importation into London, the hospital defences of which needed strengthening. Accordingly, by sect. 2 the Metropolitan Asylums Board are made a local authority under the Diseases Prevention Act, 1855, with the especial object of providing hospital accommodation for cases of cholera. The managers may (sect. 3) contract for the reception and treatment of cholera patients in any hospital, infirmary, asylum, or workhouse. All expenses defrayed by the managers under the Act are to be spread over the whole metropolis. The amount expended by any metropolitan local authority other than the managers in providing hospital accommodation is to such extent as may be determined by the Local Government Board, together with two-thirds of the expenditure for salaries, to be repaid to them from the Metropolitan Common Poor Fund. Vestries and District Boards may borrow money for the purpose of providing hospital accommodation (sect 5). The managers are required by sect. 6 to provide on the banks of the Thames wharves or landing-places not exceeding three in number, within the metropolis, and one wharf or landing-place beyond the metropolis, for the embarkation and landing of persons removed to or from any hospital ship or hospital belonging to the managers. Sites for this purpose may be acquired compulsorily. Sect. 7 provides that the admission of a person suffering from infectious disease into any hospital provided by the managers is not to be considered as parochial relief so as to disqualify. Power is taken by the Local Government Board under sect. 8 to assign to the Port of London Sanitary Authority any of the powers of an urban authority under the Public Health Act of 1875. Lest the metropolitan sanitary authorities should imagine that their responsibilities are in any way diminished, sect. 9 expressly enacts that nothing in the Act shall be deemed to exempt any such authority from the performance of any duties assigned to them by regulations which the Local Government Board may make under the Diseases Prevention Act. The Act is not to continue in force after September 1, 1884, except so far as regards any property acquired—as, for instance, the wharves mentioned in sect. 6—or act done prior to that date.

The *Factories and Workshops Amendment Act* (passed Aug. 25) brings within the purview of the principal Act of 1878 white-lead factories, which, after the 31st December next, may not be carried on unless certified by an inspector (sect. 2). The certificate cannot be obtained until—1, the stacks and stoves in the factory are efficiently ventilated; 2, sufficient means of frequently washing hands and feet, with proper appliances, are provided for the employés; 3, a proper room for meals is set apart in a part of the factory where no work is carried on; 4, an overall suit with head-covering is provided for every person working at a tank, and a respirator and head-covering for every person working at a white-bed, as well as an overall suit, head-covering, and respirator for every person working at any dry stove or rollers; and, 5, a sufficient supply of acidulated drink is accessible to all the employés. The certificate may be withdrawn if the factory is not kept in accordance with the Act (sect. 5); and for any white-lead factory carried on without a certificate a fine of 2*l.* a day may be imposed (sect. 6) Not later than Jan. 1, 1884, special rules for the guidance of the employés in the enforcement of the requirements of the Act, and for preventing injury to health in the course of their employment, are to be established and observed in every white-lead factory (sect. 7). These special rules are to be approved by the Secretary of State (sect. 8), and may be altered with his approval (sect. 9).

The Act further makes some important changes in the law as to bakehouses. No new bakehouse may be in a cellar, room, or place which is less than one-half its height above the level of the street (sect. 16), under penalty of 2*l.*, and 5*s.* a day. After May 31, 1883, no bakehouse may, under a similar penalty, be occupied unless the following regulations are complied with:—*a.* No water-closet, earth-closet, privy, or ashpit may be within or communicate directly with the bakehouse; (*b*) any cistern for supplying water to the bakehouse must be separate and distinct from any cistern for supplying water to a water-closet; (*c*) no drain or pipe for carrying off fæcal or sewage matter may have an opening within the bakehouse (sect. 17). If any bakehouse is proved to be in such a state as to be on sanitary grounds unfit for use or occupation as a bakehouse, the occupier is liable to a fine of 2*l.*, and 5*l.* for a second offence, or the court may order means to be taken to remove the ground of complaint (sect. 18). As respects every retail bakehouse (defined to mean 'any bakehouse or place the bread, biscuits, or confectionery baked in which are not sold wholesale but by retail in some shop or place occupied together with such bakehouse'), the above provisions, as well as the sections of the principal Act of 1878 dealing with cleanliness, ventilation, overcrowding, and other sanitary conditions, are to be enforced by the local sanitary authority, and not by an inspector of factories (sect. 19). For the purposes of this section, the local medical officer of health has, and may exercise, all the powers of the factory inspectors as to entry, inspection, taking legal proceedings, and the like. The health officer is to acquaint the factory inspector if he finds any child, young person, or woman employed in a retail bakehouse; and unless such persons are, or are believed to be, employed, the factory inspector is not to exercise his powers of entry or inspection under the Act of 1878.

This re-transference of the duty of the inspection of bakehouses from factory inspectors to the local health officials is a very wise measure. It has been found, and indeed admitted, that the withdrawal of the supervision of the local officers has had a very retrograde tendency as regards the sanitary condition of bakehouses generally; and moreover the staff of factory inspectors is in any case insufficient to supervise with at all the needful regularity and frequency the very numerous bakehouses which of necessity exist in every populous centre.

The *Poor Law Conferences Act* (passed June 18) authorises a Board of Poor Law Guardians, when empowered by and subject to any regulations made by the Local Government Board, to pay the reasonable expenses of any guardian or guardians, or clerk to the guardians, incurred in attending any conference of guardians on poor law matters, and any reasonable expenses incurred in purchasing reports of the proceedings of any such conference.

The object of the *Public Health Act*, 1875 (*Support of Sewers*), *Amendment Act* (passed Aug. 20) is to make provision with respect to the support of public sewers and sewerage works in mining dis-

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tricts. For this purpose the clauses of the Waterworks Clauses Act (1847) relating to mines are deemed to be incorporated with the Public Health Act of 1875, with certain necessary alterations of wording. The local authority, in announcing their willingness to treat for, or make compensation, or of intention to prevent or interfere with the working of any mines, may specify and define the nature and extent of the support for sanitary works which they require to be left. The amount of any compensation in respect of support for a sanitary work payable by a local authority is to be charged in the same manner as the expenses of the construction or maintenance of the sanitary work.

The only other public Acts to which reference need be made are three Irish Acts introduced by the Parnellite party, and apparently intended as a practical exemplification of Home Rule.

The *Cholera Hospitals (Ireland) Act* (passed Aug. 25) provides that, on receiving a certificate from a medical officer that a case of cholera has occurred within the sanitary district, it shall be lawful for the authorities of that sanitary district, having first obtained the consent of the Local Government Board, to take possession for a temporary hospital of any site within that sanitary district (sect. 1). It is to be sufficient notice to the owner or occupier to affix a notice on the walls of the union or any church or chapel in the district, or to post a copy of the notice to the occupier (sect. 2). No site is to be taken which is within 200 yards of a dwelling-house without the consent of the occupier (sect. 3), and not more than two acres may be taken for any site (sect. 5). The owner or occupier may be granted such compensation as the Local Government Board may award (sect. 4). The Act expires on May 1 next (sect. 7), so that the opportunities of testing its very peculiar provisions will probably not be numerous.

The *Epidemic and Other Diseases Prevention Act* (passed Aug. 25), which is made to apply to England also, provides that when regulations for the prevention of some formidable epidemic have been made by the central authority, the works of speedy interment of the dead, house-to-house visitation, medical aid, hospital accommodation, cleansing, ventilation, and disinfection, required of local authorities, shall be deemed purposes for which sanitary authorities may borrow money. Such loans may be made forthwith, and without any preliminary notice or inquiry, if the Local Government Board think proper (sect. 2). Opportunity is also taken of giving the Irish Local Government Board power of imposing duties on urban sanitary authorities, as well as on boards of guardians, in the event of regulations being necessary for the prevention of a dangerous epidemic (sect. 3).

The *Labourers' (Ireland) Act* (passed Aug. 25) requires a sanitary authority to make an improvement scheme—to be confirmed by the Local Government Board—where a representation is made to it that the existing house accommodation for agricultural labourers and their families within any section of the sanitary district is deficient, or is unfit for human habitation owing to dilapidation, the want of light, air, ventilation, or other proper conveniences, and that such defects cannot be effectually remedied otherwise than by an improvement scheme for the erection of other buildings in lieu of or in addition to the dwellings already existing in the district (sect. 4). The details to be given in such representation, the requisites of the improvement scheme, the proceedings for its confirmation, the award of costs, and the action to be taken in the event of the local authority failing to make an improvement scheme, are set out in full in the Act. When the scheme has been confirmed, it is the duty of the authority to take steps for purchasing the lands required for the scheme, and otherwise for carrying it into execution as soon as practicable (sect. 11). It will not be lawful for the sanitary authority to make a letting of any tenement erected or acquired under the Act, or any part thereof, or to permit its occupation by any person other than an agricultural labourer, nor will it be lawful to make a letting of any such tenement to an agricultural labourer for a longer term than from month to month (sect. 12). A variety of other clauses, as to the completion of the scheme on the failure of the sanitary authority, power to purchase lands, expenses of carrying the Act into execution, and the like, are contained in the Act, but need not be further referred to. The Act has a very laudable object; but we must take leave to doubt whether it will prove workable under the conditions in which Ireland finds herself at present.

Private Acts.—Our notice of the health legislation of the Session would not be complete without a reference to the local Acts containing sanitary provisions which received the royal assent. The recommendations of the Special Committee of 1882, presided over by Mr. Sclater-Booth, systematised to a considerable extent the sanitary clauses proposed in the seven local Bills of this Session, promoted by the Corporations of Birmingham, Burnley, Hartlepool, Heywood, Longton, Portsmouth, and Sheffield, so that with hardly an exception the clauses have passed into law in the shape in which they were originally introduced. The effect of these clauses is that in four towns—Burnley, Hartlepool, Heywood, and Portsmouth—the notification of infectious disease, on the dual system of report from both occupier and medical man, is now compulsory. Amongst other clauses contained in these local Acts are the following:—

1. Cowkeepers and milk purveyors must, on demand, furnish the local authority with lists of all their customers where the spread of disease by means of their milk is suspected. 2. Further powers are given as to disinfection of premises, and a penalty may be imposed on persons ceasing to occupy infected houses without previous disinfection. 3. The retention of bodies dead of infectious disease for more than forty-eight hours is prohibited; bodies of persons dying in hospitals of infectious diseases must only be removed therefrom for purposes of burial; and justices may in certain cases order dead bodies to be buried. 4. Corpses of persons dying of infectious diseases may not be conveyed in public conveyances other than a hearse. 5. The authority may provide temporary accommodation for persons whose houses are being disinfected, and nurses to attend on persons suffering from infectious disease. Of these clauses 1 is accepted by Burnley, Hartlepool, Heywood, Portsmouth, and Sheffield; 2 and 4 are accepted by all; and 3 and 5 by all but Portsmouth.

The number of places in which the local sanitary law differs from or is more stringent than the general Public Health Act has now become serious; and for this reason, if for no other, it is satisfactory to learn that the President of the Local Government Board has given an undertaking to the Parliamentary

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Bills Committee of the British Medical Association that next Session, if a measure be introduced for making the notification of infectious disease compulsory throughout the country, he will be prepared to move for a Select Committee with instructions to report on the whole subject, and to take evidence as to the best method of accomplishing such notification.

THE DUTIES AND LIABILITIES OF LANDLORDS.

It is of the first importance for the health of the community that dwelling-houses should be made and kept in a proper sanitary condition, but builders and landlords are too often inclined to neglect their duties in this respect. In the country, if a house is without proper accommodation, the inmates probably suffer; but in towns not only does this result follow, but the occupiers of neighbouring houses may very likely be victims also, though their own houses are properly constructed. In towns there ought now never to be an unhealthy house constructed. The urban sanitary authority, whether corporation or board of health, are charged with the duty of approving of the plans and superintending the construction of new houses; and if the site or plans for a proposed house appear to them unsuitable, they can refuse to allow the house to be erected, or give their consent only on condition of such alterations being made as they deem necessary; and if a builder persists in building without the sanction of the urban authority, his house may be pulled down. There is thus, it will be seen, ample security provided by law for preventing the erection of unhealthy houses in urban districts.

But in many cases houses have been built in past times before sanitary requirements were properly understood, and it is desirable for the public welfare that those houses should be put in a proper condition. Sometimes also the condition of a house has changed, and though it was originally good enough, it is desirable for the sake of the neighbourhood that expensive improvements should be carried out. In such cases the urban authority have power to order the necessary work to be done, and in most cases can charge the owner of the property with doing it. For instance, they can require a house to be provided with proper drains emptying either into a sewer or a cesspool, as they may approve, and if the work is not done, may do it themselves and charge the owner of the house with the cost; if, however, they think fit to alter the drainage of a house so as to make it conform to the general sewerage system of the district, they must do that at the expense of the rates. Besides drains, the urban authority can require the owner of a house to provide proper privy accommodation, &c., and charge him with the expense, and in this matter they can put the expense on him, if they choose to require an alteration on the ground of the unsuitability of the existing accommodation. So, too, if a drain or closet in a house is a nuisance or injurious to health, the local authority may have it remedied at the expense of the landlord. They may also require the owner of the house to provide a proper water-supply, and to do all such works as are necessary for that purpose. Not only may the owner of a house thus be charged for doing work and making alterations and additions to his house, but he may be charged also for doing other works in his neighbourhood, and only indirectly for its benefit. If his house fronts, adjoins, or abuts, on a street which has not been taken to and become repairable by the public, the urban authority may order the street to be sewered, levelled, paved, metalled, flagged, channelled, or lighted, to their satisfaction, and the expense of doing these works is chargeable on the owner of the house in proportion to his frontage. In London this liability is in respect of property adjoining *new* streets, and the owners of houses originally built in the country adjoining high roads have found themselves compelled to contribute to the expense of paving, &c., when the roads became streets by reason of houses being built along them as London grew. The occupiers of houses adjoining new streets no doubt find their houses more comfortable when the streets which lead to them are properly made and lighted, and presumably a house fronting on a good street is worth more rent and lets more easily than one fronting on a lane or an unmade road; in the same way the execution of the works of improvement, to which reference has been made above, usually increases the letting value of a house; but many landlords find the liability to do such works and to undertake the expense of them, when required to do so by an urban authority, a most oppressive burden, and one which they would willingly avoid if they could. In some cases the payment down of the considerable sums to which the required improvements amount, would be a matter of difficulty if not impossibility. But the local authority who order the works, have the power of determining not only what is to be done but how payment is to be made. They have the power of recovering the expenses, when they have done the works, summarily, by an order obtained from justices and enforceable by distress; or, if they think fit, they may declare the expenses to be private improvement expenses, in which case the charge is spread over a number of years and is paid by instalments by means of a private improvement rate charged on and paid in the first instance by the occupier of the premises affected; though the occupier may deduct these payments or a part of them from his rent, unless he has covenanted with his landlord to pay such charges.

The power to prevent a man building and to require him to make and pay for certain works which he himself does not want is in a sense an interference with his rights of property; but it is an interference which is demanded by the interests of the community. It is enforced very differently in different districts. In some towns works of public and private improvement are thoroughly carried out, and though the rates are high and owners of property are inclined to grumble at the expenditure which is forced upon them, the population is healthy and the place is evidently prosperous. In many localities, however, the local authorities are afraid to spend money for improvements, and do not see, as they ought, that the houses within their jurisdiction are properly provided with sanitary appliances. In such districts the health of the population is seldom so good as in those which are better cared for; and it is in them that an epidemic gets a footing, if once it is introduced. The enforcement of expenditure for works of private improvement may seem a hardship at the time, but if the works are properly designed and carried out, the expenditure will generally be found in the long run beneficial not only to the public, but to the owner of the property on which the money has been expended.

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condition within a specified time, failing which the vestry may execute the necessary works.

Thus it will be seen that in many respects the Metropolitan law is inferior to the law of the provinces. There is no authority which can enforce the enactment and practical carrying out of adequate by-laws. The Metropolitan Board of Works, which can control the foundations and the stability of buildings, has no power over their drainage; but all is left to be regulated by the various vestries and District Boards of Works according to their own lights.

and that the pipes from the closets are in direct communication with it. It should be his first desire to ascertain this, and, having done so, to have the cesspool treated in a proper manner by ventilating it, and by severing it from the house drain by means of a disconnecting chamber with syphon and fresh air inlet. Fortunately these contrivances are now almost legion in number, but there are still many precautions to take, whatever pattern may be decided upon, and these will hereafter be figured and explained in sufficient detail.

If the residence is in a town or city and the

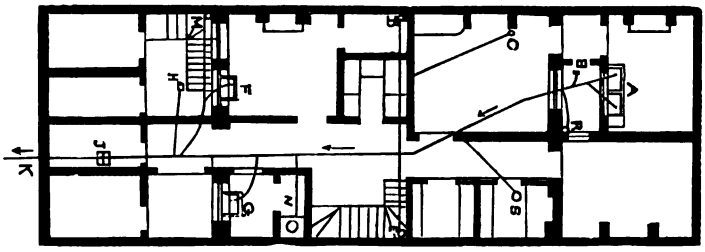

FIG. 1.

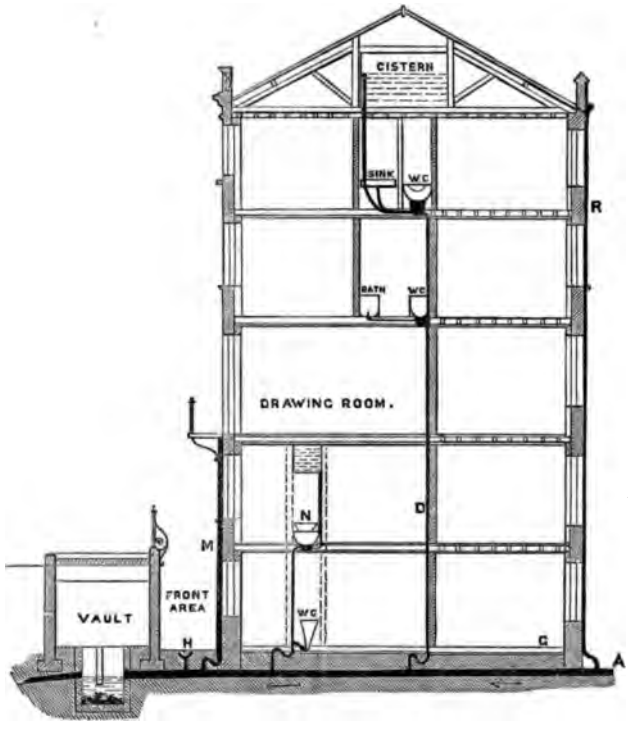

FIG. 2

§ 23. *Disconnection of House Drains from Sewers.*

The duties of an inspector of nuisances are, in truth, so very varied that it is necessary for him to be more or less perfectly acquainted with all the sanitary equipments of a residence and their several workings. If the residence is, for instance, in the country, where there is no sewer and the outfall is into a cesspool, and complaint is made of bad smells pervading the house, he will likely enough discover that the cesspool is unventilated, has never been emptied for years—if at all since it was built—

delivery be into a sewer, the disconnecting arrangement is still necessary if the house is to be properly treated, and although it is not yet made incumbent upon a builder to provide a disconnection between the house-drain and the sewer, nor upon the inspector to insist on one being provided, he should, nevertheless, be fully acquainted with its action, and able to explain the necessity of such disconnection to the occupier of the house. He will also find it very necessary to ascertain whether there is a flap-trap at the end of the drain where the latter joins the sewer.

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Having discovered and remedied a direct communication between the house-drain and the cesspool or sewer, his next desire should be to ascertain the condition of the house-drain, as to sufficiency of fall, soundness of the joints, and freedom from deposits, as it would be of no use to insert a disconnecting syphon in a drain which was faulty in any of the above respects. The methods of ascertaining the condition of the drain should therefore be within his knowledge, and he should be capable of directing the workmen how to proceed.

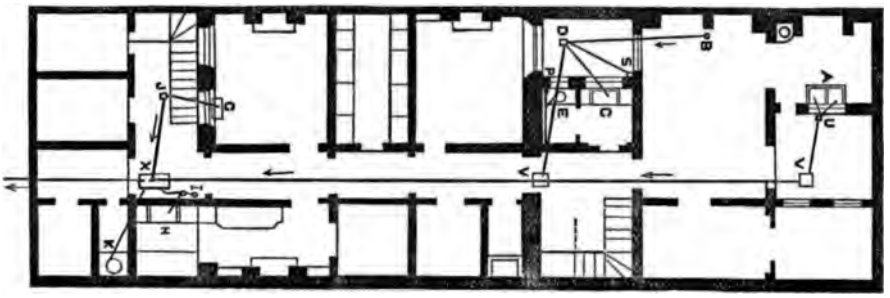

FIG. 3.

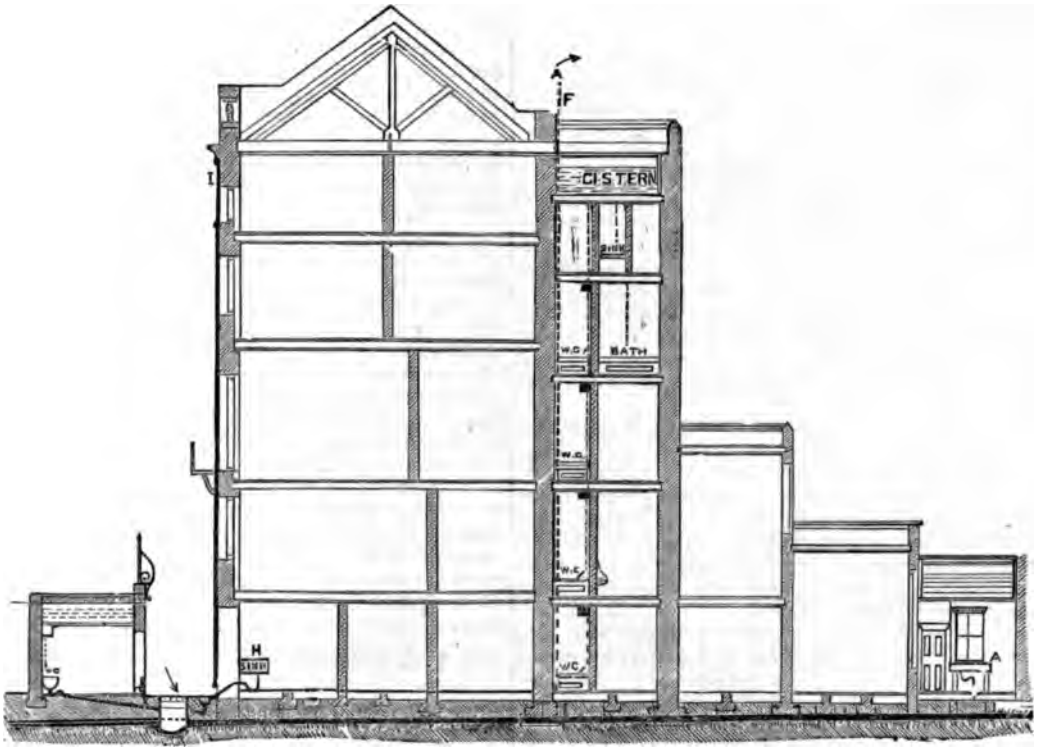

FIG. 4.

§ 24. *Soil and Waste Pipe.*

It very frequently happens that smells pervade a house, and the underground drains have nevertheless been found in passable condition. In all probability the soil-pipe will be to blame. The soil-pipe may be found to have a trap at the foot, and an air inlet syphon put in the house-drain without the workman having taken into account the necessity for the removal of such a trap in order to obtain a current of air through the drain. Or the inspector may discover that the soil-pipe is unventilated, which would also account for occasional foul smells. When the smell is persistent in the neighbourhood of the soil-pipe, he will likely enough discover that it has been eaten into holes by the foul gases from sewer or cesspool; and a ready means of ascertaining this, with the least expense, should be known to every inspector.

The chief cause of smells in a house—the drain and soil-pipe being found correctly treated and in good condition—will in all probability be discovered at the sinks. They may be found to have a direct communication with the drain, and ventilating the drain into the house, especially when the sewer is charged with a great quantity of storm water. The inspector should therefore be acquainted with a means of ascertaining whether there be a trap underground between the sink and the drain, or not, and, above all, he should be able to dictate what must be done to abate the nuisance. Mere disconnection would

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had been warned by the police not to hold the wake. The magistrate explained that the penalty for such an offence was a fine of £5, but as it was the first case of the kind which had come before them they would reduce the fine to 10s.

THE PARIS WATER SUPPLY.

SOME interesting statistics are given in a recent article of the *Journal des Débats* on the water supply of Paris, in which the writer complains of the insufficient quantity allowed for private purposes, while so much is lavished upon the streets, the boulevards, and public service generally. The total supply per head per day of water during 1877 was 185 litres (one litre equals 1¾ pints), though at the present time it is only 164; but on the completion of certain works in progress it will again return to the amount of 180 litres for a population of 2,230,928. The daily yield is furnished as follows. From the stream of the Vanne, 100,000 cubic metres; from the stream of the Dhuis, 21,000 cubic metres; from the stream of the Arcueil, 2,000 cubic metres; from the stream of the Ourcq, 125,000 cubic metres; from the stream of the Seine, 60,000 cubic metres; from the stream of the Marne, 54,000 cubic metres; from Artesian wells, 7,000 cubic metres; total, 369,000 cubic metres. (One cubic metre equals 35 cubic feet.) Of this quantity at least 75 per cent. is used for watering the streets, for the fountains, &c., leaving only 25 per cent. for the supply of houses. The expenditure of the water daily is thus given: For the runnels and flushing the drains, 139,000 cubic metres; watering the streets and squares, 65,000; private consumption, 95,000; public works, 23,000; draw-wells, 9,000; loss and waste, 38,000; making the total of 369,000. While, therefore, the public use of water averages 120 litres per head per day, the private supply is only at the rate of 42 litres. While, too, the city is so well watered at the expense of the personal health and comfort of the inhabitants, it is felt to be a grievance that the inhabitants do not get the best of the water supplied to the city. At least 125,000 cubic metres of excellent and fresh water are received daily, which would be at the rate of 55 litres per head; but a large portion of this is used for the public service, while the majority of inhabitants are supplied from the waters of the canal of Ourcq, which is more or less spoilt by the refuse of the gypsum quarries, or else by the waters of the Seine pumped up at Chaillot.

SMOKE ABATEMENT.

AT a meeting of the Newcastle-on-Tyne authority, held in the Town Hall on Sept. 10, it was decided to issue a circular calling upon owners of steam vessels and all manufacturers on the banks of the Tyne to minimise to the lowest possible standard the emission of smoke from their chimneys. The Corporation of Newcastle have put in a new and improved boiler at their Gallowgate Baths, with the view of abating the smoke nuisance so much complained of in the neighbourhood.

SANITARY SCIENCE EXAMINATIONS AT CAMBRIDGE.

THE examination for certificates in sanitary science by the University of Cambridge will begin on Tuesday, Oct. 2. The names of candidates, who must be on the Medical Register of the United Kingdom, should be sent to Professor Liveing, Cambridge, on or before Sept. 28.

THE CHEMICAL COMPOSITION OF FISH.

THE subjoined table of fish analyses is taken from a paper by W. O. Atwater in the *Berichte der deutschen chemischen Gesellschaft*, July 23, 1883, and published in the *Chemist and Druggist*, August 15, 1883. The proteine is calculated by multiplying the amount of nitrogen by 6·25, the total of water, proteine, fat, and ash represents 100. The percentage of dry substance is given separately.

	Per Cent.				
	Water	Dry Substance	Proteine	Fat (Ether Extract)	Ash
FRESH FISH—					
Cod (*Gadus morrhua*), average of five samples	82·04	17·96	16·38	0·36	1·22
Herring (*Clupea harengus*)	68·57	31·43	18·99	10·95	1·49
Mackerel (*Scomber scombrus*), average of six samples	73·10	26·90	18·57	7·07	1·26
Perch (*Perca fluviatilis*), average of two samples	79·20	20·80	18·73	0·83	1·24
Pike (*Esox lucius*)	79·73	20·27	18·66	0·58	1·03
Salmon (*Salmo salar*), average of three samples	62·93	37·07	22·93	12·81	1·33
Sturgeon (*Acipenser sturio*)	78·59	21·41	18·08	1·90	1·43
Trout (*Salvelinus fontinalis*), average of three samples	77·57	22·49	19·18	2·10	1·21
Roes (hard), average of 245 samples	73·19	26·81	21·34	3·89	1·58
FISH WITH SPAWN—					
Salmon (*Salmon salar*), male	75·34	24·66	19·17	4·37	1·12
" " female	78·34	21·66	17·66	2·83	1·17

	Per Cent.					
	Salt	Water	Dry Substance	Proteine	Fat (Ether Extract)	Ash
PRESERVED FISH (smoked, dried, &c.)—						
Cod (dried)	2·88	14·75	85·25	75·41	1·84	5·12
Mackerel (salted)	10·60	42·57	57·43	21·34	22·80	2·69
Cod (salted), average of two samples	20·58	51·77	48·43	24·40	0·34	3·11
Herring (smoked)	11·66	34·38	65·52	36·76	15·74	1·46
PRESERVED FISH (in tins)—						
Mackerel	1·93	63·38	31·62	19·69	8·70	1·30
Pilchard	—	56·62	43·38	24·98	12·76	5·04

BORACIC ACID FOR PRESERVING FOOD.

BORACIC ACID has of late been much talked about, and either alone or mixed with other substances actually employed as a food preservative. In a paper by J. Foerster, sent to the *Berichte der deutschen chemischen Gesellschaft*, July 23, 1883, and *Chemist and Druggist*, August 1883, he points out that, from the results of diet experiments, carried out under his direction, the protracted consumption of even small quantities of boracic acid with the daily food is, in his opinion, detrimental to proper nutrition.

The author found that, living upon a diet consisting exclusively of milk and eggs, with and without the addition of boracic acid, and carefully examining

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the fæces in all cases where boracic acid had been consumed, there was an increase in the excretion of dry substance and nitrogen, that more than the normal quantity of bile was excreted, and that albuminous constituents of the food were unnecessarily lost.

GAS AS AN ILLUMINANT.

WE are glad to find so eminent an authority as Captain Douglas Galton, C.B., exploding some vulgar fallacies as to the salubrity and heat-producing qualities of coal-gas. In a lecture recently delivered at the Parkes Museum, Captain Galton said, in reference to these points :—

'We complain of gas, but if we were satisfied with the same amount of light in the case of gas which we obtain with candles or lamps, we should not find the vitiation of the air more inconvenient with one than with the other.

'An experiment mentioned by Mr. Clegg in his treatise on the manufacture of gas may be mentioned here in illustration of this. The flame of coal-gas, and the flames of several combustible bodies that gave an amount of light equal to it, were burned separately in given quantities of atmospheric air, and the times were noted at which the flames were extinguished by the contamination of the air. The following were the results :—

	Minutes.
Colza oil was extinguished in	71
Olive oil ,, ...	72
Russian tallow ,, ...	75
Sperm oil ,, ...	76
Stearic acid ,, ...	77
Wax candles ,, ...	79
Spermaceti candles ,, ...	83
Coal-gas (13 candles),, ...	98
Cannel gas (28 candles)	152

The preceding numbers may be taken to indicate the comparative salubrity of the several illuminating materials, from which it appears that the atmosphere of a confined room lighted by cannel gas, would support life twice as long as the atmosphere of the same room lighted equally by tallow candles. Nor does the complaint that is frequently made of the heat of rooms lighted by gas afford a much better foundation for an objection to gas lighting than its assumed insalubrity. The fact may be true that a room lighted by gas is hotter than when lighted by candles, but the cause is to be attributed, not to the greater heat-giving power of the gas, but to the greater illumination when gas is employed. If persons would be satisfied with the same dim light to which they are accustomed when burning candles, or if they would increase the number of the latter so as to equal the light of the gas flame, the heat given out would be found to be less when burning gas than when burning lamps or candles. It has, indeed, been proved by experiment that the combustion of colza oil produces nearly twice as much heat as the flame of cannel gas of the same standard of luminosity, and that in comparison with ordinary thirteen-sperm-candle gas the proportionate amounts of heat are as 78 to 68. A room lighted by a large moderator lamp burning colza oil is perceptibly heated quite as much as by a gas flame that gives a larger amount of light.

'The conditions which affect the purity of the air of a room are, however, not all the same in the case of lamps or candles as those which prevail when gas is used. In the case of the lamp or candle, the wick either draws up the hydrocarbon on which it depends for its light by capillary attraction, or else this hydrocarbon is forced up the wick at a uniform rate by an equable pressure. In the case of gas it is usually different. The gas comes from a street main in which the pressure is constantly varying, partly in consequence of the continual variation which takes place in the number of lights in use. For instance, if a large shop suddenly lights up its establishment, a sudden decrease of pressure would occur in the neighbouring houses. In order to obtain sufficient light in a neighbouring house, it might be necessary to turn the cock of the burners full on. When the lights in the shop were extinguished, the pressure would be suddenly increased, and the gas would be forced through the burners more rapidly than it could be consumed ; consequently much impurity might be forced into the house, in the shape of unconsumed gas. It is therefore necessary to regulate the pressure at which the gas reaches the burners, and many of the complaints of the impurity of the air of a room, caused by gas, arise from this want of regulation of pressure. The pressure can be regulated by the use of a governor, placed either at the meter or in proximity to the light itself.'

THE PRESIDENT OF THE LOCAL GOVERNMENT BOARD.

IT would be paying a poor compliment to Sir Charles Dilke to say that he is the best President of the Local Government Board of whom the nation has yet had experience. Into the merits or demerits of his three predecessors it is unnecessary, and perhaps inexpedient, to go ; but we shall not be contradicted in asserting that the statesmanlike manner in which Sir Charles Dilke has conducted the business of his department since he took office has commanded general admiration. 'There is nothing like seeing things for yourself,' says an old saw, and Sir Charles has shown his sense of the practical wisdom of the adage by deciding to make a tour of all the London workhouses to see with his own eyes how affairs are managed. He has, moreover, paid unexpected visits to a variety of places, with the praiseworthy object of forming his own judgment from actual experience and observation of things as they are. In other respects besides this, his administration of the Local Government Board has shown marked ability. He has chosen the best men to fill up staff appointments, regardless of political influence, or of anything but merit—as witness the recent appointments of Mr. C. N. Dalton and Mr. A. D. Adrian (two of the hardest workers in the department) as assistant secretaries. On the first rumours of cholera in Egypt, he called to his assistance a scientific council consisting of some of the best known medical experts and administrators, with whom he discussed the measures to be adopted for the protection of this country. He put his chief medical adviser into active and intimate communication with the health officers of the metropolis, a conference of whom was convened at the Charing Cross Hotel. He took a firm stand against the sophistries of Mr. Peter Taylor, and did not temporise with the anti-vaccinators, as did Mr. Dodson. In these and other ways that need not be particularised he has earned for his department a reputation for expedition and business-like capacity that comes upon us with a shock of

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pleased surprise. Next year, if the opportunity is afforded him, Sir Charles Dilke ought to do great things for public hygiene.

MAGNESIA IN BEER.

A CORRESPONDENT in an evening contemporary (*Globe*) has introduced the use of chemicals by brewers to public notice, and has appealed to the medical profession to state whether the constant use of magnesia and Epsom salts in beer is advisable.

Magnesian chemicals are now replacing those of lime on account of their freedom from the harsh, rough taste given to beer by lime salts. The slight bitterness also saves hops. As various chemicals are sold under names such as DS,— P,— R,—C and D,— the brewer himself is not aware that he is using magnesian salts. It is quite time that he was so informed. Chemicals containing magnesia are C and D (chloride of magnesium and sulphite of soda) for preserving and bittering beer, and B W (containing Epsom salts and sulphate of soda) to alter the water to produce Burton ale. Now, since B W is used in the water and C and D in the beer, it would be interesting to know how much magnesia has been added. Nor must it be forgotten that in a diluted condition magnesia is exceedingly powerful. In a reply to the *Globe* letter, the editor of the *Country Brewers' Gazette* does not deny the use of these 'materials'; but we question whether the 'test of their analyst' should be final on the public. Mr. Denston's further statement that beer from malt and hops alone cannot be obtained is almost incredible.

AN IMPORTANT DECISION UNDER THE CONTAGIOUS DISEASES (ANIMALS) ACT,

AN appeal case lately decided at the Sheriff's Court, Glasgow, is of considerable importance to local authorities and to the public. The original suit for damages was raised by William Harkness, a butcher in Glasgow, and was against the Lord Provost, magistrates, and Town Council, the local authority under the Contagious Diseases (Animals) Act, 1878. The pursuer claimed £9 19*s.* 6*d.* for loss and injury sustained through the defenders' inspector having, on February 11 and 13, illegally seized and condemned portions of twenty-four bullocks belonging to the pursuer, and which he had slaughtered in the public slaughter-house in the ordinary course of business. The defence was that the authorities were legally entitled to act as they had done. The Sheriff-Substitute, after hearing the evidence, decerned in favour of the pursuer for £7 with expenses. This judgment has now been reversed by the Sheriff Principal. Sheriff Clark's interlocutor is as follows:—'Having heard parties' procurators and considered the evidence and whole process, finds, that the portions of the bullocks in question were seized and carried away from the pursuer's custody or possession and boiled down as being more or less affected with the foot-and mouth disease, and unfit for human food; finds, that the defenders are responsible for these proceedings, and that technically there was a departure from the statutory provisions and rules applicable thereto; finds, however, that the portions of the animals so carried off and boiled down were unfit for human consumption, the purpose to which the pursuer intended to apply them, that consequently no damages are proved, therefore recalls the interlocutor appealed against and assoilzies the defenders from the conclusions of the summons, but in the special circumstances of the case finds neither party entitled to expenses, and decerns.' The main contention of the pursuer was, that though an organ, a tongue, for example, or a head, is affected at one point, the whole organ is not therefore to be condemned; that the diseased part having been excised, the remainder is quite wholesome and may be sold for human food. It is needless to say that the medical testimony adduced was distinctly against such a monstrous proposition, Professor McKendrick, Dr. Littlejohn, Dr. Russell, and Professor Cleland, all uniting in condemning in the strongest terms the practice of using for human food the remains of organs from which diseased parts had been excised. We think the pursuer has much reason to be thankful to the vigilance of the authorities which put it out of his power to sell as wholesome food what might have produced the most serious consequences to the unsuspecting public; and it is unfortunate that the procedure of the authorities involved such a legal irregularity as prevented them from being allowed their costs.

POISONING BY DISEASED MEAT.

DR. RUYSCH reports the poisoning of about two hundred persons in the town of Heesch, Holland, who had eaten the flesh of a cow that had died in giving birth to a calf, also the flesh of the still-born calf and of another dead calf. All who had eaten the meat were taken ill and three died. They suffered from severe gastric symptoms, chills, fever, headache, and great depression, so that the physicians supposed at first that they had to do with an epidemic of typhoid fever. Others presented the symptoms merely of gastro-enteritis. The nature of the poison in the flesh could not be clearly determined, as none of the animals had died from an infectious disease.

HOUSE DRAINAGE AT LAMBETH.

THE Lambeth Vestry has very wisely adopted the following report of its Sewers and Sanitary Committee:—

'It is now generally recognised that trapping each inlet to the drain does not provide sufficient security against the passage of foul air from the sewers into the houses, and the only effectual means of protection is by placing a trap on the drain near its connection with the sewer, and before the drain reaches the house. Doing this necessitates the introduction of some principle of ventilation into the drain, as the foul air cannot be driven into the sewer because of the trap, and if allowed to remain in the drain would soon become highly offensive and dangerous. The simple way to counteract this evil is to provide an inlet for the air from as low a level as convenient, and a means of escape as high as the housetop; the difference of atmospheric pressure will generally maintain an upward current and prevent the air in the drain becoming foul or being forced into or absorbed by the water in the syphon traps upon the several branches leading into the drain from closets, baths, sinks, or other connections. This provision has been voluntarily adopted in many cases of late, where effective sanitary considerations are taken into account; but where the option is left to the builder, whose interest in the premises will cease as

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soon as he can effect a sale of them, and is therefore desirous of economising expenditure, regardless of consequences, nothing short of compulsory obligation will secure the small but very necessary outlay. It was resolved to recommend the Vestry to embody this requirement in their regulations as to house drainage, as is done by many vestries and local boards of health.'

It is to be hoped that the example set by the large and densely populated parish of Lambeth will be taken to heart by other metropolitan parishes with equally satisfactory results.

DEAD PRISONERS.

THE *Sanitary Engineer* tells a recent story from Texas, which illustrates in a grotesquely horrible way the indifference of people to the condition of their drinking water. A public well in Brownsville was cleaned out a short time ago, and in it were found the remains of a prisoner who had disappeared, it is said, several years since. Then the people remembered that, to be sure, the water did at one time taste bad, and hair and flesh had been found in it. But as it was supposed these came only from drowned rats or cats, they went on drinking the water unconcernedly. The question of dirt was of no importance; distilled dead animals they endured with equanimity—only when it proved to be a dead prisoner did they attach any importance to the bad taste and smell.

FISH DINNERS.

THE very sensible measure of varying the monotonous diet of our paupers by a weekly fish dinner seems to be spreading. We read that the Wolverhampton and Dover Boards of Guardians at recent meetings instructed their clerks to communicate with the Local Government Board, to obtain their sanction to give the inmates of these workhouses a fish dinner every Friday. The Manchester and Bolton Guardians have also decided upon trying the experiment of fish dinners for the inmates of the workhouse. It is anticipated that a considerable saving will be effected, and the day selected for the dinner is Friday, with a view of meeting the religious difficulty caused by the susceptibilities of the Roman Catholics. It must, however, be borne in mind that fish is an article of food which requires good and careful cooking to make it nutritious and palatable. Workhouse cooking is not generally famous for either of those characteristics, and it will behove the guardians to see that a sloppy mess is not served to the inmates of the workhouses under the name of a 'fish dinner.' The addition of fat to fish by frying it is about the best rough method of cooking it, or it may be baked with great advantage. Steaming fish is a great improvement on boiling it, but the addition of fat or butter is necessary, both for nutrition and palatability, and the manufacture of gallons of butter sauce is a satisfactory manner in a culinary operation scarcely to be looked for in a workhouse kitchen.

METROPOLITAN SANITARY PRECAUTIONS.

THE sanitary inspection of Hackney, instituted by Dr. Tripe and the Sanitary Committee, is now nearly completed. About 30,000 houses have been visited, for which an extra staff of men have been engaged; and it is said that never since the year 1866 have the sanitary authorities of the district been so busily employed. One result of the inspection has been to show that the better class of houses, which have not hitherto been included in the visitations of the ordinary staff, are found to be sadly defective in sanitary matters. Great attention is being paid to the water supply, particularly in those houses which were erected previously to the year 1856, and in which the use of modern appliances is being enforced.

POISONOUS WALL-PAPERS.

THE following, emanating from a firm of practical manufacturers, Messrs. Sim and Barclay, of Jane Street, Leith Walk, Edinburgh, may be a useful contribution to the discussion on the subject of poisonous colours in wall-papers:—'In a long and practical experience as colour manufacturers, we have never known arsenic used in the manufacture of any colour suitable for wall-papers except emerald green. This bright and beautiful colour has never been equalled by any non-arsenical green; but it is expensive, and of very poor covering properties. For greens, blacks, blues, browns, reds, yellows, &c., either dry or in oil, the colour maker has no need to use arsenic, and we cannot conceive what object would be served by his doing so, and certainly he would not do so in reducing a colour to a tint with white. Years ago, a yellow was used called "King's" or "canary" yellow, containing arsenic; but it is long out of date, and was only used by coach painters. The whole matter rests upon the medium by which the tint or colour is fixed to the paper or wall, and the volatility of any component part. Even emerald green is perfectly harmless if properly secured by oil or varnish; but when used in cheap and showy papers where there is little or no fixing material, we can understand there is danger if exposed to undue heat. In better-class papers it is seldom used. In regard to abstaining from use of poisonous metallic substances in the manufacture of wall-papers, we can only say that, unless scraped off and eaten, they are perfectly harmless.'

THE ELECTRIC LIGHT IN THEATRES.

PROFESSOR MAX PETTENKOFFER has recently given in the *Wiener Medizinische Presse* a detailed opinion of the electric light in theatres, in which he draws the following conclusions:—1. The electric light hinders, to a great extent, the overheating of the air in the theatre. 2. Of course, it does not render ventilation of the theatre superfluous, but affords in itself a more thorough means of ventilation than gaslights, which contaminate the air of the room by the heat and products of combustion, both of which are avoided by using the electric light.

A PENNY WATER PURIFIER.

MR. FREDERICK GUTHRIE, of the Science School at South Kensington, sends to the *Pall Mall Gazette* suggestions for making a penny water cleanser. Proceeding upon the principle of aëration, and the assumption that subtle as the disease germs in water may be they shall not escape the touch of the oxygen, Mr. Guthrie argues that to thoroughly purify water it should be allowed to run over as large a surface as possible, and while so running it should be freely exposed to the air. To make the filter a flower-pot

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and a brick are required. Break the bottom out of the flower-pot in such a way as to leave edge enough to hold up half a brick. Let one corner of the half brick stand out through the bottom hole. Break up the rest of the brick into bits about as big as a quarter of a walnut, and throw them into the pot. Soak the whole overnight in a pail of water and let it drain. The water which is to be purified should be allowed to drip upon the middle of the chips of brick, and after a few hours the water which drops from the bottom will be perfectly pure and wholesome. This purifier, unlike most of those in general use, combines a rather coarse filtration with an effective aëration, and something of a specific chemical action as well.

THE PUBLIC HEALTH

DURING AUGUST 1883.

THE mean temperature during last month at the Royal Observatory, Greenwich, was 62°·0; it was 1°·2 above the average August temperature in one hundred years, and considerably higher than that recorded in the corresponding month of 1881 or 1882. An excess of temperature prevailed on fourteen days of the month, while on each of the other seventeen days it was below the average. The warmest day of the month was the 21st, when the mean was as much as 69°·2, and showed an excess of 7°·9; the coldest day was the 8th, when the mean did not exceed 56°·1, and was 6°·6 below the average. Rain was measured at Greenwich on ten days during the month, to the aggregate amount of 0·72 of an inch, which was less than one-third of the average August rainfall in sixty-one years. During the first eight months of this year the rainfall amounted to 12·9 inches, which was 2·9 inches below the average rainfall in the same period of sixty-one years. The sun was above the horizon during 449·1 hours in August, and 156·8 hours of bright sunshine were recorded at Greenwich; this amount was 23·4 hours above the average in the corresponding month of the five years 1878-82. South-westerly winds prevailed almost throughout the month. The recorded amount of ozone was below the average of the corresponding period of recent years; a considerable excess prevailed during the second week of the month.

In the twenty-eight large English towns now dealt with in the Registrar-General's Weekly Return, which have an estimated population of more than eight and a half millions of persons, 27,488 births and 16,104 deaths were registered during the five weeks ending the 1st inst. The annual birth-rate, which had declined from 36·0 to 34·2 per 1,000 in the four preceding months, further fell to 33·3 during August, and was 1·1 per 1,000 below that which prevailed in the corresponding period of last year. The lowest birth-rates in these twenty-eight towns last month were 26·5 in Huddersfield, 27·2 in Brighton, and 27·3 in Halifax; in the other towns the rates ranged upwards to 38·2 in Blackburn, 41·6 in Cardiff, and 43·7 in Sunderland. In London the birth-rate was 32·5 per 1,000, whereas in the twenty-seven provincial towns it averaged 33·9.

The annual death-rate in the twenty-eight towns, which had been 19·0 and 20·7 per 1,000 in the two preceding months, declined during the five weeks of August to 19·5; this rate was 2·5 below that which prevailed in these towns in August 1882. The lowest annual rate of mortality last month in the twenty-eight towns was 13·3 in Halifax. The rates in the other towns, ranged in order from the lowest, were as follow:—Bristol, 14·6; Norwich, 15·5; Birkenhead, 16·0; Derby, 16·3; Bradford, 16·5; Hull, 16·6; Cardiff, 17·0; Wolverhampton, 17·9; London, 18·1; Plymouth, 18·1; Bolton, 18·6; Huddersfield, 18·6; Blackburn, 18·8; Brighton, 19·0; Portsmouth, 19·1; Oldham, 19·7; Birmingham, 19·9; Nottingham, 20·3; Leicester, 20·5; Leeds, 20·7; Sunderland, 20·8; Sheffield, 22·6; Salford, 22·6; Manchester, 25·1; Liverpool, 25·8; Preston, 26·7; and the highest rate during the month 27·2 in Newcastle-upon-Tyne. While the death-rate in London during August was only 18·1, it averaged 20·7 in the twenty-seven provincial towns. The 16,104 deaths from all causes in the twenty-eight towns during the five weeks of August included 1,582 which were referred to diarrhœa, 547 to measles, 525 to scarlet fever, 254 to whooping-cough, 252 to 'fever' (principally enteric), 122 to diphtheria, and 39 to small-pox. In all, 3,321, or 21 per cent. of the total deaths resulted from these principal zymotic diseases, equal to an annual rate of 4·0 per 1,000. This zymotic rate last month in the twenty-eight towns, owing chiefly to the decreased fatality of diarrhœa, showed a decline from the high rate in the preceding month, and was considerably below the rate from the same diseases in these towns during the corresponding period of 1881 and 1882, when it was 5·0 and 5·5 respectively. The death-rate from the principal zymotic diseases in London during August was equal to 3·5 per 1,000, and 0·9 below the average rate in the twenty-seven provincial towns, among which it ranged from 0·8 in Halifax, and 1·5 in Norwich, to 6·8 in Liverpool, 7·3 in Newcastle-upon-Tyne, and 8·9 in Preston. Diarrhœa caused the high death-rate in Preston, measles in Newcastle-upon-Tyne, and measles and fever in Liverpool.

As in the preceding month, diarrhœa was by far the most fatal zymotic disease in the twenty-eight large towns during August. The annual death-rate from this disease in these towns, which had been 0·5 and 2·4 in the two preceding months, declined to 1·9 during August, which was as much as 1·6 below the rate recorded in the corresponding months of last year, when it was 3·5 per 1,000. In the several towns the diarrhœa death-rate ranged from 0·4 and 0·8 in Halifax and Bristol, to 3·5 in Sheffield, 3·8 in Salford, 4·3 in Leicester, and 7·7 in Preston. While the diarrhœa rate did not exceed 1·4 per 1,000 in London, it averaged 2·4 in the twenty-seven provincial towns. The rate of mortality from measles, which had been 0·72 and 0·71 in June and July, further fell to 0·66 during August; in London the death-rate from this disease was 0·80, whereas in the twenty-seven provincial towns it did not average more than 0·54 per 1,000, but was equal to 1·5 in Liverpool, and 3·4 in Newcastle-upon-Tyne. The death-rate from scarlet fever in the twenty-eight towns, which had been 0·49 per 1,000 in each of the two preceding months, rose to 0·64 in August; in the corresponding periods of 1881 and 1882 the scarlet fever death-rates in these towns were 0·78 and 0·51 respectively. No death from this disease was returned last month in Norwich; Plymouth, Derby, Birkenhead, or Bolton; in the other towns the death-rate from scarlet fever ranged upwards to 1·4 in Birmingham, 1·8 in Sheffield, and 1·9 in Leeds; these two last-mentioned towns having shown each month since the commencement of the current year the highest rates of mortality from scarlet fever. The annual death-rate from whooping-cough in the twenty-eight towns, which in the corresponding months of 1881 and 1882 had been 0·44 and 0·54 per 1,000 respectively, was last month only 0·31, and showed a further slight decline from the rates returned in recent months. In London the death-rate from this disease was 0·31, and almost corresponded with the average rate in the twenty-seven provincial towns, among which it was equal to 0·5 in Sheffield, and 0·8 in Brighton. The rate of mortality from 'fever' (principally enteric), which had been 0·23 and 0·25 in the two preceding months, further rose to 0·31 during August. In London the death-rate from fever was only 0·20 per 1,000, but in the twenty-seven provincial towns it averaged 0·39 per 1,000, and was equal to 0·7 in Portsmouth, and 1·2 in Liverpool. The rate of mortality from diphtheria, which in the two previous months had been 0·13 and 0·15 per 1,000, was again 0·15 during August. In London the

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diphtheria death-rate was equal to 0·22 per 1,000, and more than double that recorded in the provincial towns, wherein it averaged only 0·09. Eight deaths were referred to this disease in Leeds during last month, and four in Manchester. During the five weeks of August 39 fatal cases of small-pox were recorded in the twenty-eight towns; of these, 14 occurred in Birmingham, 10 in London, 5 in Liverpool, 4 in Sunderland, 3 in Newcastle-upon-Tyne, and 2 in Leeds. Judged by the returns of the Metropolitan Asylum Hospitals, the prevalence of small-pox in London last month showed a slight increase; the number of small-pox patients under treatment in these hospitals, which had steadily declined from 90 to 55 in the four preceding months, was 57 at the end of August. The average weekly number of new cases admitted to these hospitals, which had been 10, 11, and 6 in the three preceding months, rose to 10 during August.

The rate of infant mortality in the twenty-eight towns, measured by the proportion of deaths under one year of age to births registered, was equal to 177 per 1,000 during August, which was considerably below that recorded in the corresponding periods of 1881 and 1882, when it was 200 and 226 per 1,000 respectively. In London the proportion of infant mortality was 156, whereas in the twenty-seven provincial towns it averaged 195 per 1,000 births, and ranged from 96 in Halifax and 120 in Hull, to 241 in Liverpool, 295 in Preston, and 308 in Leicester.

The death-rate from diseases of the respiratory organs, judged by the metropolitan returns, was below that recorded in the corresponding period of 1882. The average weekly number of deaths referred to these diseases in London during August was 166, and the annual death-rate was equal to 2·3 per 1,000, against 2·0 and 2·7 in the corresponding periods of 1881 and 1882. The annual death-rate from these diseases in Liverpool last month was 3·1 per 1,000.

The causes of 397 of the deaths in the twenty-eight towns during the five weeks of August were not certified, either by a registered medical practitioner, or by a coroner. These uncertified deaths were equal to 2·5 per cent. of the total deaths, which was slightly below the rate in the same period of 1882. The proportion of uncertified deaths in London was only 0·9 per cent., while it averaged 3·6 per cent. in the twenty-seven provincial towns; all the causes of death were duly certified in Portsmouth throughout the month, and but one was uncertified in Cardiff, whereas the proportion of uncertified deaths was equal to 5·2 per cent. in Liverpool and in Bolton, 6·7 in Oldham, and 7·5 in Wolverhampton.

Among the population living in the outer ring of suburban districts around London, estimated at rather more than a million persons, the annual death-rate from all causes was equal to 15·4 per 1,000 during August, against 17·4 and 17·2 in the corresponding periods of 1881 and 1882. The annual death-rate from the principal zymotic diseases in these suburban districts, which had been 1·6 and 3·4 in the two preceding months, was 3·0 in July. During the five weeks ending Sept. 1st, 129 fatal cases of diarrhœa, 44 of measles, 42 of scarlet fever, 31 of whooping-cough, 21 of diphtheria, 19 of 'fever' (principally enteric), and 4 of small-pox, were recorded in the outer ring. The fatality of diarrhœa and diphtheria showed a decline, whereas that of scarlet fever and of 'fever' showed a marked increase. Fourteen fatal cases of measles, 10 of scarlet fever, and 19 of whooping-cough, were recorded in the district of West Ham; 8 deaths from diphtheria were returned in Tottenham sub-district, 14 of scarlet fever in Epsom sub-district, and 6 of measles in Chiswick sub-district. Of the 4 deaths referred to small-pox during August in the outer ring 2 occurred in Edmonton sub-district, and 2 in the district of West Ham.

THE Vestry of Paddington have decided to spend a sum not exceeding 750*l.* in improving the existing mortuary, and in adding another *post-mortem* room thereto.

SPECIAL REPORTS.

FIRST SWISS ALPINE MILK.

WE have received the following important report on the 'First Swiss Alpine Milk,' from M. Vignal, of the Collège de France, Paris, a highly-skilled biologist and trustworthy observer :—

During a recent visit to Lake Constance the directors, who are also the proprietors, of the 'First Swiss Alpine Milk Exporting Company,' invited me to go over their manufactory at Egnach, in the neighbourhood of Romanshorn, close to Lake Constance.

I was assured that neither sugar nor any foreign substance is added to the condensed milk preserved by this company. The system adopted consists of removing from the milk two-thirds of the water it contains, and submitting it to the influence of heat, which not only effectually prevents lactic and butyric fermentation, but also destroys all germs (bacteria, microphytes, &c.)—a source of numerous illnesses. The consumption of condensed milk daily increases. It often constitutes the sole source of nourishment for infants; therefore it is not only necessary to guard against adulteration, but also against a less evident danger—the transmission of such maladies as phthisis, typhoid fever, diphtheria, &c., since it has been demonstrated by the investigations of many eminent scientific men that milk is a vehicle of contagion. In cities and large towns pure milk can only be obtained from certain large milk companies; it may therefore be useful if I describe in detail what I observed during my visit to Romanshorn.

The first impression on entering the factory is that rigid cleanliness is observed throughout, and there is not the faintest odour of sour milk. The ground is covered with concrete. Water is supplied in abundance, and turned on to wash away any milk that may chance to fall to the ground. A receiving department, a condensing department, a department where the milk is put in tins and bottles, and one where the packing is done, are provided. This organisation evidently prevents any admixture of impurities with the milk. All utensils and appliances are cleansed after each operation in the process of condensing milk. They are washed in hot water, then submitted to the influence of steam, are afterwards cleansed with sand, and, finally, again treated with steam.

The following incident may give an idea of the scrupulous care observed in this manufactory. Whilst talking to a workman, who had just cleansed an immense copper vat used for heating milk, I accidentally laid my hand on the inside and left an impression on the bright metal; the workman immediately rubbed it with sand, washed it with water, and then turned on a jet of vapour. The same scrupulous cleanliness is observed in filling the tins and bottles. All the workmen, whether they are employed in filling, in soldering, or in testing the soldering by means of high pressure, are provided with a sponge with which to wipe up drops of milk which may by chance have been spilt. Not only after every step in the process of condensing milk and filling the bottles and tins are all the machinery and utensils cleaned as I have described, but also again every evening, when there is a general cleansing of every article in the factory, including tables, trays, and the concrete covered floor; all are washed with soda and water.

A dining-room and a smoking-room are provided for the use of the workmen, who are strictly forbidden to smoke or eat in the factory.

On complimenting the director on the scrupulous cleanliness observed throughout his establishment and the crusade made by him against microphytes, he replied: 'Extreme cleanliness is with us an absolute necessity; in other factories, perhaps, it can be regarded as a luxury; but

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with our process, if the slightest impurity mixes with the milk in any one of its stages, more than 6,000 litres of milk are spoiled. Nevertheless, even with all the precautions taken by us, as we do not use any foreign substance in order to preserve the milk, but arrive at this result by excluding all germs, we lose at the rate of 2 per cent. on our tins of milk. But few bottles are lost, because after they are cleaned the germs cannot enter; but, as soldering is a more lengthy process than corking bottles, a few germs may penetrate in a certain percentage of the tins.' A loss of 2 per cent. is the usual proportion in laboratories in the case of tubes or bottles filled with artificial cultivation fluid for the purpose of studying bacteria—a corroborative proof that the condensed milk of this company does not contain any chemical substance in order to preserve it.

The tins used by this company are made by machinery on their own premises, and the different parts are so arranged that the milk they contain does not come in contact with the solder, which is composed almost solely of tin. Thus all danger of lead poisoning, which it has been demonstrated may result from consuming canned food contaminated by lead, is avoided.

The directors of the milk factory at Romanshorn contract with the peasants to supply the factory with milk twice a day, and bind them to accept certain conditions with regard to grazing and cleanliness; also to keep the milk at a low temperature. Its specific gravity is tested, and if below 1,032 it is rejected. When the milk arrives it is cooled, then heated and condensed in vacuo at a slightly higher degree of heat. In order to avoid deterioration of its constituent parts, milk sugar, caseine, fatty matters, &c., always resulting from the influence of heat when it has lost a little more than two-thirds of its water, at a density of 1·1066 (at 25° centigrade), it is rapidly enclosed in bottles or tins.

During the various operations observed in the process of condensing milk, the milk does not come in contact with the workmen's hands nor with their clothes; as they are all effected by machinery, whichonly removes the water contained in the milk. This is a very important advantage in the process adopted by the 'First Alpine Exporting Milk Company,' inasmuch as condensed milk is very often prepared with milk that has been deprived of its cream. Four hours are sufficient to prepare a bottle or tin of condensed milk; thus milk brought to the factory at six o'clock is ready for use at ten. The condensed milk prepared at the factory at Romanshorn is a thick liquid of a more or less yellowish tint. This is due, the directors informed me, to the smaller or larger quantity of green food given to the cows, which is a rational explanation, as it is well known that in spring and autumn the butter is yellower than at other seasons of the year, owing to the presence of a certain proportion of chlorophyll in the milk. In taste and smell it exactly resembles first-rate cream; when mixed with twice its bulk of water it is exactly similar to good fresh milk when boiled.

I visited the factory at Romanshorn several times, but never saw either sugar or any foreign substance added to the milk. The analyses made by several eminent chemists, among whom are Von Moser, E. Egger, Hassall, &c., failed to reveal the presence of any foreign substance.

Fresenius made an exhaustive analysis, which I quote, and which alone would suffice to prove the truth of the assertion made by the directors:

	Per cent.
Caseine	10·65
Albumen	1·27
Butter	10·87
Milk sugar	14·26
Inorganic substances	2·36
Total of solid substances...	39·41
Water	60·59
	100·00

The inorganic substances are as follows.

	In 2·36 parts.		100 parts.
Borax	0·630	...	26·69
Natron	0·256	...	10·85
Lime	0·543	...	23·01
Magnesia	0·057	...	2·41
Oxide of iron	Traces	...	Traces
Phosphoric acid	0·669	...	28·35
Sulphuric acid	0·049	...	2·08
Chlorine	0·202	...	8·56
	2·406	...	101·95
Less oxygen of chlorine	0·046	...	1·95
	2·360	...	100·00

The condensed milk contains consequently both organic and inorganic substances in the same proportion as genuine milk, and is free from foreign ingredients.

The condensed milk of this company easily mixes with water, and as it does not contain any sugar, it is more liquid than any other, therefore the mixture is effected very rapidly, especially in summer. If an equal quantity of water to that extracted is added, that is to say, twice the volume of milk, the mixture presents the same constituent parts, and in the same proportion, also the same taste and smell as those of cow's milk, and shows 13·3 per cent. solid residue, a proportion presented by an average genuine milk.

The following analysis, also made by Fresenius, which he compares with Vieth's analyses, shows the composition of the condensed milk when diluted with water:—

	The mixture of one part condensed milk and two parts water.			Pure milk contains on average, according to Vieth.
Water	86·87	..	...	87·25
Butter	3·62	...	...	3·50
Caseine	3·55	...	...	3·50
Albumen	0·42	...	...	0·40
Milk sugar	4·75	...	...	4·60
Inorganic substance	0·79	...	...	0·75
	100·00			100·00

The results of these analyses, coupled with my personal observations, lead me to agree with Fresenius, Hassall, Bamberger, Banze, &c., and to consider that the condensed milk prepared by this company contains all the properties necessary to render it an excellent article of nourishment. W. VIGNAL.

[This report we regard as of the highest interest to physicians and to all who are concerned in the feeding of infants and in the regulation of dietaries into which condensed milk enters. There are well-known objections to tha use of ordinary condensed milks, which are variously manipulated and treated with large additions of cane sugar. Here pure milk alone is used, and the most recent acquisitions of scientific knowledge, based on the researches of Pasteur and Lister, are used so as to secure for the milk such conditions of scientific cleanliness and freedom from germs as enable it to be condensed and packed without any foreign addition, and by the mere abstraction of its water, which can be added at the moment of consumption.—ED.]

THE BERLIN SANITARY EXHIBITION.

(FROM OUR SPECIAL REPORTER.)

(*Continued from page* 72.)

LIFE-SAVING APPLIANCES.

IF it be not agreeable to find rascality in the manufacture of appliances for saving life, it is yet in a sense satisfactory to find that such practices are not confined to England. It appears that the Germans are rather subject to being deceived in the worth and value of the large lifebuoys, made apparently of cork, with a white sail-cloth covering, and the name of the ship painted upon them, which, hung up in

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accessible places on board steamships and other vessels, give such a sense of security to the passengers, because it is not known that some of the manufacturers of these articles, in place of cork, stuff sail-cloth with light rubbish that will readily take up water and drag the shipwrecked or overboard passenger down to speedier death. Nor is it sufficient to be satisfied that the contents are of cork. There is cork and cork, and for life-saving purposes the best cork is much better than the commonest. The German Lifeboat and Humane Association has made experiments in this matter. It took three pieces of cork of equal size, but of different quality, and found their weight in grammes to be as follows. No. 1, of fine cork, 600; No. 2, of middling quality, 700; and No. 3, of ordinary cork, 1,000. After having been twenty-four hours under water they were taken out and weighed, and their respective weights found to be increased as follows. No. 1 to 750 grammes, No. 2 to 950, and No. 3 to 1,375. Thus the pieces of cork were heavier and less able to sustain a weight in water by, in grammes, No. 1, 150; No. 2, 250; and No. 3, 375. The society has, since this experiment, taken care that only the best cork is used, as well for these lifebuoys as for the cork jackets with which the men in charge of lifeboats are supplied. Each cork jacket is tested to take up no more than 500 grammes of water in 24 hours, and at the end of that time to be capable of keeping the shoulders of the wearer above water, though he be a heavy weight, and clothed in thick woollen garments, and wearing stout sea boots.

As a complement of these matters of wind and water, there is a very handsome meteorological pavilion erected and furnished under the direction of the Government Science Department dealing with meteorology. Over the entrance is placed an aneroid barometer of the best construction, made by Otto Bohne, of Berlin; and on the right and left of the portal are hung two fine thermometers, relatively made by C. F. Guszler & Son and G. Polack, of Berlin, whilst there rotate on the roof the golden, half-hollow balls of a large wind gauge or anemometer, which shows how it mechanically registers the force of the wind on maps on the ceiling of the room beneath. There is a large collection of thermometers, hygrometers, and surface thermometers to measure the temperature of the earth, together with examples of barographs, and thermographs. There are also instruments for controlling ventilation of buildings and mines.

Ventilation of Mines.

The German Government concerns itself far more with the ventilation and safe working of mines than does the English Government, for the simple reason that so many mines are Government property. Then, too, mining and iron-making and manufacturing are amongst the foremost of German industries, not only on account of the importance and value of their productions, but from the number of people which they employ. The statistics for 1881 show that during that year 460,431 persons were so employed, of whom 303,633 were employed in iron and coal mining generally, and 151,119 in ironworks; 212,000 were in collieries.

The number of exhibits shown alike by the State, companies, and private individuals of the means taken for the security of the miner, and the prevention of accidents to those engaged in iron-making and manufacturing, is very large and interesting. The most interesting exhibit to the general observer is part of a coal mine built up in natural size and form with real coal, an exhibit which is made by the Prussian Government. Either the comfort of the visitor has been specially considered or they manage these things better in Germany, for one may walk through this mine with the greatest possible comfort and pleasure. The good road, of ample height and breadth, is most brilliantly lighted with Swann's electric lamps, which would burn as brightly and as cheerfully for the miner beneath the surface as for the dainty lady visitor to the exhibition. The rails and the waggons and all the requirements and means for transporting men and material are there of the lightest and best construction and in the most admired of order. One starts to see miners at work in all sorts of positions; and one does not realise for the moment that they are the mere figures of men putting up 'timber' or breaking down and removing coal—they are so life-like and so unnaturally clean. Very death-like also is the figure of a miner in the arms of another whose mouth and nostrils are protected by an apparatus that enables him to inspire the foul air from which he is rescuing a comrade from being suffocated. There are several kinds of apparatus and instruments of this kind on view, though examination of them is difficult and description of them without drawings still more so. They are much used to the saving of human life in German mines, though all attempts to introduce them into English ones have failed.

From a number of other exhibits one finds that the men at the different collieries are formed into bodies for instruction in the safer pursuit of their hazardous occupation, and to the technical visitor the reports and statistics of the Knappschaftsvereins, their leaders, doctors, managers and directors of hospitals, orphan asylums, &c., cannot fail to be both interesting and instructive. The directors of the royal mines of Saarbrücken make a very complete show of methods and materials for working those extensive collieries, together with the reports and descriptions of technical schools and other methods of technical instruction, and the means taken for the safety and welfare of the thousands employed. The Royal mining department exhibits a series of models which show the progressive improvement made during the last fifty years in the machinery for descending and ascending coal-mine shafts, and for the protection of men from suffocation by foul air. Amongst the individual and tradesmen's exhibits, one of the finest and most comprehensive is that of L. von Brennen & Co. of Kiel, whilst Siemens & Halske, who light the Swann lamps of the model coal mine, have a large show of electric signals and other applications of electricity for the prevention of accidents and the preservation of life.

Electrical Appliances.

The medical and surgical uses to which electricity and magnetism can be put are abundantly exhibited by Galle of Berlin, Gaurnack and Reinboth, of Breslau; Hesse, of Berlin, Hirschmann of Berlin, Krüger of Berlin, Reineger of Erlangen, and Bosz of Berlin. The various objects shown for general application of electricity for these purposes divide themselves into four classes—transportable and stationary machinery and apparatus for constant and induced currents for local electrisation, galvanic machines, machines for the application of electricity to baths; and machinery and apparatus for the generation of static electricity; all of which are of very careful construction, finely finished, and showing that the art of philosophical instrument making has reached a very high degree of development in Germany. Some of the latest and best improvements are shown by Hirschmann, whilst Krüger shows some good apparatus on Dr. Spamer's system, and Hesz some on the Leclanché system. The speciality of this latter are the electric magnets of the form suggested by Prof. Fröhlich for extracting bits of iron or steel that may have penetrated the eye.

In another direction electricity is likely to become useful in connection with eyes. At a recent meeting of the Hygienic Congress, in connection with the Exhibition, it was suggested that much of the shortsightedness now so general in Germany amongst even comparatively young school children, as well as students of riper years, is due to the deficient and unscientific character of the supply of artificial light to schools and colleges. The gas-lights are very few and naked, whereas there should be at least one gas jet to every four children or students, and every light should have a shade. There was a general consensus of opinion at the Congress, that provided it could be duly softened and shaded there could not be too much of such light,

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and that the question of the introduction of electric light into schools would simply be one of time, and this more especially in schools of art and technical instruction, as the electric light makes it easier for the eye to note the distinctions of colours. Such light was held to be far less heating to the eyes, and in this respect would be found useful in handicrafts where the light and the object operated upon, as in watchmaking and fitting, must be brought near to the eyes. It is clear, however, that electricity has much to do before it can meet the requirements of perfect artificial light, useful alike to the road and the room, to the requirements of the manufacturer and the student. Though not large, yet comprehensive, the number of exhibits at the Berlin Exhibition with this aim make it manifest that the production of such a light is only a question of time. One good the introduction of the electric light has effected; it has called attention to the insufficiency of all other artificial lights hitherto provided, and is calculated to beget what the Germans call a 'light hunger' in the public; to satisfy which electricians are planning and scheming to produce and maintain such a light as it is now clear electricity alone can give. It has also stimulated the ingenuity and competition of gas and lamp makers to improve the existing mediums of light.

Dental Appliances.

Some thirty dentists have exhibits, which show that though the Germans, unlike the Americans, have no special institution for instruction in dental art, yet they are as advanced in its knowledge and application as any country in Europe. The exhibition is a remarkably complete one of its kind, containing a large display of best materials, and the best means of applying them; from preventing a decayed tooth from too speedily leaving the mouth, to supplying its place when it is gone. It is not generally known that the manufacture of artificial teeth is a branch of the potter's art. The best teeth, like the best china, come from kaolin mixed with the purest of silicate to prevent shrinking. Then comes a mixture of metals and metal oxides, by which eighty different tints can be given to the material, the number of which may be increased twofold by combinations, so that every shade of the original teeth can be given to the artificial supply. The manipulation of these mixtures to the production of teeth of all sorts and sizes requires no little exercise of the cunning of the porcelain-maker's hand, and the utmost care in stoving. All this and all that relates to the supply and fitting of artificial teeth is admirably illustrated by the German dentists, who show themselves very skilful members of their important craft. That importance, as everyone knows, is mainly in relation to the nutriment we are to get from our daily bread. But the sharp eyes of the Germans, like those of the English, see that we may with our bread get much that will mar its nutriment; and some sharp-eyed medical man, whose foresight would do credit to the compiler of the most sensational paragraphs in the *Lancet*, has evolved the startling theory that bakers—like other men—not being free from the moral and physical weaknesses of humanity, and being shut up in hot bakehouses, perspire freely—may even with their hands knead the dough to the danger of imparting the seeds of disease to be digested in sickness and death by all who eat of their bread. This theory having been emphasised by the fact that bread, the dough of which was kneaded by a baker who went from the bakehouse to bed with typhus fever, gave that disease to a whole community, led Herr Julius Behrand (of Leipsic-Lindenhau) to invent a kneading machine, which forms a popular and interesting object in the Exhibition. It is a very handy little machine, which may be made in all sizes, from the smallest for hand-work for a family 'batch,' to a size needing steam power to prepare the bread for a whole neighbourhood; and which will knead a dough of 200 grammes in eight minutes. Whilst, however, baking has become in Germany a matter of medicine, it has yet to become a matter of police, for no law yet bears upon the bakers or bakehouses as in England; where, however, the law is of little use, from the lack of inspectors to see that it is enforced.

Drinks.

What corresponds to the great 'drink question' in England is, judged by this exhibition, one of growing importance in Germany. Beer, though plentiful enough, is far from being the principal drink. If Germany be noted for its beer, it is also noted for its trink-halles, set up in all manner of convenient quarters of a town, where for 1*d.* the thirsty soul may obtain a seltzer or soda water, and for another penny may have it flavoured with one of a variety of syrups. This institution is in full swing at the Exhibition, but more popular still are the kiosks for the sale of Apfelwein, which is cider with its asperities toned down and made delightful by flavours and syrups. Or it may be mingled for the drinker who is regardless of cost with the best apology to be found for champagne. Then there are shops which offer one the pleasant maitrink; coffee in the composition of which egg enters; and the familiar black coffee of the French; whilst a variety of dairy-like shops are spread about for the sale of pure milk at a few pfennigs a glass. Add to these, kiosks for the sale of tea, chocolate, and cocoa, cups of which are gratuitously distributed as samples of the excellence of the powders with which the drinks can be made in a moment. Wines are various, from the weakest of Cape to the strongest of Spanish. Wine has not yet come in Germany under the medical ban, and some sorts are proclaimed as being under special medical favour. Those thus favoured change from time to time, as every one knows, and some sarcastic Germans who walk about seeking what they can criticise, say that the recipe is changed according to the taste of the writer. The prevailing medicinal proclivity at the Berlin Exhibition is for Hungarian wine, which was so strongly favoured by the German doctors last year that, notwithstanding that the Hungarian wine harvest was almost a failure, curiously enough Hungarian wine specially recommended by the faculty, so far from failing, was sold at a remarkably cheap rate in every town and village of the great German Empire. Next to this, Malaga and special 'Tokay' come in for the physician's favour, and whether nature is willing to meet the demand or not, the wine makers find no difficulty in doing so. French wines seem very plentiful, though French wines have been brought very near extirpation; the Spanish, however, can supply their place, and German distillers have been doing a good export trade, sending to Spain the spirits to fortify the wine, which after coming through France is sold to the Germans for the purpose of strengthening their constitutions. With all these facts before them no wonder that the Germans, knowing nothing of blue ribbonism, cling to their beer with a strong hand, and, indeed, it is not a weak one that can raise the huge glass basins in which the German drinks his frothy white beer; whilst a stronger hand than head is needed to raise the heavy tankard of brown beer which the more enterprising imbibers can get for 3*d.* (*To be concluded in our next.*)

MEETING OF YORKSHIRE MEDICAL OFFICERS OF HEALTH.

Cholera.

A SPECIAL meeting of the members of the Yorkshire Association of Medical Officers of Health has been held at Leeds, for the purpose of considering the subject of 'Asiatic cholera—the lessons from past outbreaks and the duties of sanitary authorities, of sanitary officers, and of the public in view of the possible introduction of that disease into this country.' Mr. S. W. North (York), President of the Association, occupied the chair. There were also present Mr. T. Haigh (Meltham), Dr. Rawson (Thornton), Dr. J. M. Wilson (Doncaster), Dr. Giddings (Calverley), Dr. Hime (Bradford), Dr. Scott (Ilkley), Dr. Law (Helmsley), Dr. Arbuckle (Thorne), Dr. Murray

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(Burley-in-Wharfedale), Mr. W. Pogson (Seacroft), Mr. T. Atkinson (Settle), Mr. A. Roberts (Keighley), Dr. Shives (Liversedge), Dr. Britton (Halifax), Mr. Spencer (Bradford Infirmary), Mr. Ainsley, Dr. Harrison (Pontefract), Dr. Wilson (Pudsey), Dr. Goldie (Leeds).

The President, in opening the discussion, said it was not unnatural that there had recently been considerable anxiety in this country lest, through our communication with Egypt, cholera should spread to England. Previous outbreaks had established the fact that cholera was spread through human intercourse. It had also been proved that nurses and attendants could mix with cholera patients with impunity provided they kept themselves clean. One question for the association to consider was as to how cholera was diffused. Some persons regarded its diffusion as analogous to that of typhoid fever, and a great deal was to be said in favour of that theory. That it was sometimes caused by contaminated water was incontrovertible. Cholera prevailed invariably in its fullest extent in low-lying districts, among crowded and filthy populations, and especially among those who lived on land which was water-logged or sewage-logged. It was beyond doubt that the contagion of cholera must be some entity, for it was impossible to believe that they could have a disease of such marked characteristics without its having an origin in some distinct germ. The sanitary measures proposed in this country and in India were based on the assumption that wherever there were the conditions he had mentioned there was liability to outbreaks of cholera. It therefore seemed to him that sanitary authorities ought to take measures for counteracting the effects of those conditions by good drainage, good water, effective sanitary inspection, and by impressing upon the people the desirability of keeping themselves clean, and not living in overcrowded dwellings. In his opinion it was possible to put a community in such a condition that it would be almost impossible for cholera to spread among the people.

Dr. Deville gave some of the results of his experience gained in the treatment of cases of cholera in London and other parts of England in the year 1849. He said that cholera had always broken out first at a port. Hence, in 1849, it raged in London, Liverpool, Hull, Sunderland, Newcastle, and in various towns on the Tyne, the Tees, and the Wear. In London its ravages were felt more particularly in the south and east. While it was playing sad havoc at Knaresborough, the town of Harrogate, only a few miles distant, escaped altogether. The same thing occurred at Leeds, for while people were dying oft every day in the centre of the town, Chapeltown and Headingley were not visited by the disease. These facts showed that cholera stuck to particular districts where the conditions were most favourable for its spreading. He regarded the cholera germ as a microscopic fungus, which existed and thrived in damp, low-lying situations, with filthy surroundings. The mortality from cholera was always the highest when it first visited a district, and then it gradually began to decrease. So soon as the frost appeared the cholera disappeared. Mortality from cholera differed according to the ages of the persons attacked and to their general bodily health when they first took it. Persons advanced in life were more liable to take the disease and to die from it. In 1849 the mortality from other diseases fell to such an extent that the death-rate, in spite of the great number of fatal cases of cholera, was little above the normal. That proved that persons ailing from other diseases were more liable to take the cholera and die from it. The habits and circumstances of life had a great deal to do with susceptibility to take the disease. Filth and intemperance were fatal when cholera was about. Mental shock, caused by fear, made a person more liable to take cholera. Dr. Deville went on to insist upon ample ventilation, cleanliness, thorough sanitary arrangements, a pure water supply, and efficient disinfection.

Dr. Hime said that the conditions which were essential to the development of an epidemic of cholera were:—1. A locality occupied by men, permeable to water and air to a certain depth at which the ground water lies. 2. A greater or less variation in the degree of dampness of this stratum—the period of sinking of the ground—water from a high level being the most dangerous. 3. The pollution of this stratum with organic and especially fæcal matter. 4. The presence of the specific germ of cholera. 5. A predisposition on the part of some persons. Common sense showed that in a country like ours quarantine could not be successfully carried out. Little also could be done in a large community to affect the disposition of individuals to catch the disease. What they might and should do was to combat the local conditions which encourage the spread of the disease. The splendid results already achieved by improved sewerage works, water supply, and other sanitary measures, proved that by their operation an unhealthy town might be made healthy. Fevers and similar diseases had already been enormously diminished. The introduction into a town of a person infected with cholera was like bringing a match into a powder magazine—it would produce no explosion till the fatal spark was applied. Unless the accumulated filth in the soil and surroundings of our dwellings were ready to cause the imported poison to become active, no epidemic would follow. Their energies should, therefore, be ceaselessly employed in the attempt to discover and eradicate the deadly conditions, instead of uselessly running after odd cases of disease. Instead of sprinkling disinfectants on filth, they should see to it that no filth was allowed to accumulate. They should extend their drains and sewers; banish stinking, leaky middens, which discharge their fluid and solid contents into the ground, and their foul gases into the air we breathe. Disinfection on a large scale must for the present be a secondary means of defence. They did what general sanitation could and had effected. Let them provide wholesome water in view of cholera, because it was essential to health. Let all philanthropic agencies, distribution of food and raiment to the poor, gratuitous baths, and so forth, continue and be extended; but let them never rely on these and neglect the main factors of sanitary reform.

Dr. Britton said that in his district he had not thought it necessary to issue any special instructions which would alarm the people, but the sanitary officers were told to look out for and remove every possible unsanitary condition, such as large accumulations of refuse, overcrowding of houses, want of cleanliness, and so on, in order that the district might be the better able to withstand any epidemic that might arise. He thought that was all that was necessary for them to do under present circumstances. In this district he did not fear a cholera epidemic. In the case of an epidemic he believed that disinfection would be a valuable aid to them. As thorough ventilation was a necessity, they ought to set their faces against the erection of back-to-back houses, which in some Yorkshire towns were a source of great danger in the case of all infectious diseases. In such houses they could get no current of air, and the likelihood of disease spreading in such houses was very great indeed.

Dr. Giddings said that he was surgeon in 1853 on an emigrant sailing vessel going out to New York. Out of nearly 600 persons only about 120 were landed alive, the rest having died of cholera on the voyage. It was a singular fact that not one of the cabin passengers took the disease, the mortality being confined to the steerage passengers.

Dr. Scott related his experiences among the Turkish troops in the Crimean war, and remarked that the best preventives of cholera were cleanliness and sanitation, and the best treatment good nursing.

Mr. Roberts said that in Keighley everything was being done to put the town in order. The greatest difficulty they had to contend with was to get the houses properly connected with the drains. He had advised a proper inspection of lodging-houses, the removal of ash-

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pits where there was a possibility of percolation, and that all the people should drink only town's water, of which there was a good supply. He had also recommended the erection of an infectious diseases hospital for the district.

Dr. Shives and Dr. Low having briefly addressed the meeting,

Dr. J. M. Wilson said that while they ought not to excite alarm by anything they might say, he thought that nothing should be done to minimise the actual danger which arose to the public from the possibility of an outbreak of cholera. It would be unwise to pooh-pooh the more than usual activity prevailing in some districts in regard to their sanitary condition; they ought to call upon their sanitary authorities to look the matter in the face, and, if necessary, put themselves to some expense in order to resist the introduction of cholera. Sanitary works and good supplies of water had been most effectual in preventing outbreaks of cholera. There were numerous instances, among which were those of Glasgow and Selby, which went to show that by the adoption of the proper precautions cholera could be greatly minimised. In case of an outbreak the district affected ought, in his opinion, to be properly disinfected.

Dr. Deville expressed the opinion that quarantine was of no practical value whatever. He believed that the disease was transmissible in the clothes of persons and in other things coming from infected localities.

The President then moved the following resolution :—'That in the opinion of this meeting, cholera is transmissible by men and things coming from an infected locality. That cholera is likely to prevail with great intensity in low-lying localities, where the soil is wet and liable to contamination by organic matter. This liability is increased where the population is dense, and when general want of cleanliness prevails. That there is abundant evidence to show that cholera has been diffused by drinking water contaminated by infected sewage, and that very small portions of this infected sewage are sufficient to affect large populations using water contaminated with it. That in view of these facts it is desirable that sanitary authorities should take especial care to secure pure water—*i.e.* water free from all contamination by sewage; to secure the cleansing and purifying of all courts, passages, and crowded localities; the cleansing by flushing and ventilation of all sewers and other filth channels; the drainage and purification of the soil of all low-lying districts and its protection from impregnation with filth and other organic matter, especially excremental matter; the removal of all overcrowding, the cleansing and lime-washing of all lodging and tenant houses; and generally the purification of the air and soil in and about dwelling houses.'

Dr. Britton seconded the motion, which was adopted unanimously.

SCOTTISH VETERINARY ASSOCIATION.

The Diseased Meat Question.

At a recent meeting of the Scottish Veterinary Association, held in Edinburgh, Professor Walley read a paper on the consumption of the viscera and other parts of the bodies of animals affected with foot-and-mouth disease. He stated that his attention had been called to the subject by a trial which recently took place in the Glasgow Sheriff Court, in which action the fleshers of Glasgow sought to hold the magistrates liable in damages for the destruction of heads, tongues, feet, and tripe, and in some cases of the hearts of animals which had suffered from the disease (see p. 124). He held that where there were marks of disease on the organs of the animals these should be condemned; but he also showed that owing to the complex processes which many of these parts pass in preparation for human food no possible harm could result, and so far no positive evidence existed as to any harm having resulted from the consumption of such food. He further stated that there was absolutely no alteration of any kind to be detected in the blood or tissues of any animals affected with the disease. In the discussion which followed, Mr. Pottie, Paisley, considered the profession should come to some understanding as to the diseases in animals that were hurtful to human beings by consuming the flesh. He was very much struck with the evidence adduced in the Glasgow case by medical gentlemen who, he held, could not form a proper opinion as to disease in the lower animals. He found them very ignorant of these matters, and it would be impracticable to follow out the opinions they gave. The disease had existed from time immemorial, and carcases of animals suffering from it had been eaten without in a single case any evil results. Professor Williams, Edinburgh, said if they were to go upon the basis that cooking the flesh of diseased animals destroyed the virus, then they might simply go upon the broad principle that no matter what the diseased condition of an animal might be at the time of its death, after undergoing the process of cooking it was fit for human food. He knew of no veterinary surgeon who would assert that the lungs of such an animal, no matter how slightly affected, could be eaten with impunity. He had no doubt that the lungs of animals affected with pleuro had been eaten without any deleterious effects, but he thought they should condemn all portions of animals suspected of being diseased. If they held the opinions set forth that day, they directly supported the sale of diseased meat, for a butcher did not tell his customers that he had bought diseased animals at a reduced price, and that he sold at the same price as he obtained for the flesh of healthy animals. His opinion was that they ought to set their faces strongly against the sale for human food, not only of the tongues of diseased animals, but of all parts of the carcase which might be suspected to contain the germs of disease. The flesh of animals which had been affected with anthrax, one of the most fatal maladies with which they were afflicted, had been eaten over and over again after being cooked, and that without any contagion; but he held they were not justified in recommending as fit for human food the flesh of any animal that had died from the disease. Professor Baird, Edinburgh, asked Mr. Pottie if he would purchase the flesh of an animal which had been killed for foot-and-mouth disease at the same price and as readily as he would do that of a sound animal. Mr. Pottie replied: Yes, quite as readily. Mr. Baird: Well, I would not. Professor Walley, in reply, protested against it being even supposed that he supported the sale of diseased animals. He only asked if there was anything to prove that human beings suffered from using the flesh of such animals, and he said there was not. Assuming, however, that such portions of the carcase were used as food, there was no proof whatever that they would do harm if they had been subjected to the process of cooking. Butchers, he said, did not purchase animals suffering from disease at a much lower rate than they bought other healthy animals.

ARTISANS' AND LABOURERS' DWELLINGS.

Unsanitary Dwellings.

The following circular has been recently issued by the Local Government Board to Town Councils and other local authorities, calling attention to the provisions of the Artisans' and Labourers' Dwellings Improvement Acts, and urging the destruction, where necessary, of unsanitary dwellings :—

Local Government Board, Whitehall, S.W.
July 21, 1883.

Sir,—I am directed by the Local Government Board to advert to the memorandum prepared by their medical officer on the precautions to be taken against cholera, copies of which the Board recently forwarded to the sanitary authority.

In that memorandum attention was called to the importance of certain measures being taken with reference to water supply, the removal of refuse, and the cleansing of dwellings, and particularly of such dwellings as are densely occupied. Measures of the kind referred to in the memorandum can be adopted in both urban and sanitary rural districts, but in connection with this subject the Board are desirous of bringing under the notice of urban sanitary authorities the

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special powers conferred upon them with regard to the dwellings of the working classes by the Artisans' Dwellings Acts, 1868 to 18·1.

Section 5 of the Act of 1868 requires the medical officer of health, if he finds that any dwelling-house or inhabited building is in a condition dangerous to health so as to be unfit for human habitation, to report the same to the sanitary authority. This report is to be referred to a surveyor or engineer, who is in turn to report on the cause of the evil, and the remedy, and whether the evil can be remedied by structural alterations, or whether the premi es ought to be demolished.

The Act provides for the consideration of all such reports by the sanitary authority, for opportunity being given to the owner to state his objections to them, and for the execution of the ne essary works or the demolition of the premises, either by the owner or by the sanitary authority. Attention should be directed to Section 5 of the Act of 1879, under which the sanit ry authority may, in certain circumstances, be required to purchase the premises.

Section 8 of the Act of 1882 further provides that although a building is not in itself unfit for human habitation, yet the medical officer of health is to report upon it if he finds that it is an obstructive building as defined by the section, *i.e.* that it is so situate that by reason of its proximity to other buildings, or its contact with them, it stops ventilation or otherwise conduces to make the other buildings to be in a condition unfit for human habitation, or else prevents proper measures from being carried into effect for remedying the evils complained of in respect of other buildings. The proceedings to be taken in connection with a report on an obstructive building are analogous to those to be taken in respect of one on a building unfit for human habitation, but if the sanitary authority decide not to allow any objections which may be made by the owner, they must direct that the building shall be pulled down. Provision is made for compensation to the owner.

The Act of 1868 originally only applied to places with a population of 10,000 and upwards, but this limitation was removed by the Act of 1879, and the Acts in question now extend to all urban sanitary districts. The Board would urge that effect should be given to them in all those cases in which the exercise of the important powers which they confer is required.

As regards places with a population of 25,000 and upwards, the Board would also refer to the provisions of the Artisans' and Labourers' Dwellings Improvement Acts, 1875 and 1882, under which schemes can be made for the improvement of unhealthy areas. The Board, in a circular which they issued to the sanitary authorities of these districts on Nov. 10 last, called attention to the diminished cost with which such schemes can be carried out, owing to the alterations in the law made by the Act of 1882, and they direct me to state that they hope that where the unhealthy ar as have not been already dealt with, advantage will be taken of the facilities afforded by these statutes to deal with places which cannot fail to be a cause of danger to the public health.—I am, &c.

(Signed), HUGH OWEN, Secretary,
The Clerk to the Urban Sanitary Authority.

THE DUBLIN LADIES' SANITARY ASSOCIATION.

(FROM OUR DUBLIN CORRESPONDENT.)

THE second lecture of a course on 'The House and its Surroundings,' delivered before the Ladies' Sanitary Association by Mr. W. Kaye Parry, M.A., B.E., was on the subjects of 'Drainage and Sewer Gas.' The lecturer observed that the cities of antiquity were well provided with sanitary arrangements. Rome, Carthage, Jerusalem, Nineveh, Pompeii, and Herculaneum, and many others were provided with large arterial sewers that answered the same purposes, and were constructed much in the same way as ours of the nineteenth century. In the neighbourhood of Chester, amongst other Roman remains, were found pipes not unlike the sewer-pipes of the present day. The large sewers which honey-combed all the streets of Dublin city were very little better than huge gas-mains charged with a gas more offensive and dangerous than coal-gas, and the vast majority of the inhabitants of our town had laid on these mains to their private dwellings without thinking fit to put a stopcock on, as they would do with gas-mains, to turn it off when they had done with it. This could only be accounted for by the fact that people were very ready to use what cost them nothing. The conditions for removal of house refuse by water were good sewers, a good supply of water, plenty of ventilation, and a good outfall. Sewer-gas had been found to be composed of carburetted hydrogen, sulphuretted hydrogen, ammonia sulphide, carbonic acid, and putrescent animal matter. When the quantity of water was not great in comparison with the refuse, and the quantity of air was comparatively small, then dangerous results would inevitably follow, and it was therefore evident that ventilation in the sewers was of the utmost importance. No thorough system of ventilation of main sewers had yet been adopted, nor did he know of any thoroughly efficient system. In Dublin all the main sewers discharged into the Liffey, which could hardly be considered a suitable channel for such a purpose. At high tide the water, in spite of the tidal valves, rose up through all the lower levels of the sewers, forcing the gas back into the highest levels, and, compressing it, gave it an additional tendency to enter the house connected with the main sewers. During heavy rains and thunderstorms a large quantity of water was discharged into the sewers, and the gas forced into the house. Again, the temperature of the house was very much higher than that of the sewer, and therefore they were actually pumping up the gas into their dwellings. All doctors were agreed that the presence of this sewer-gas was in the highest degree prejudicial to health. The first thing to do to counteract this gas was to disconnect the house sewer from the main sewer by means of a water-trap. Then they must consider the position of the drains in the house, seeing that the pipes were properly laid, the joints carefully made, and the ventilation good—for sometimes the compressed gas would burst the lead pipe. Defective joints in sewer-pipes could be discovered by pouring hot water flavoured with peppermint into the pipe: wherever there was a flaw the odour of peppermint would be perceived. As to the storage of water, care should be taken that there was no communication between the water used for the drain and that used for household purposes. The two points he wished to impress were the necessity of disconnection and abundant ventilation in the drains.

HEALTH OF IRELAND.

IN the last quarterly return of births, marriages, and deaths in Ireland, recently issued, are published statistics relating to the marriages in that country for the third or summer quarter of 1882, while those relating to births and deaths are for the fourth or winter quarter, ending Dec. 31 last. The birth-rate was slightly below the average of the corresponding quarters of recent years, while the death-rate, owing principally to the excessive cold during part of December, exceeded the average. The returns of pauperism for the quarter, compared with those for the corresponding period of the previous year, show a slight decline in the number of persons in receipt of in-door relief, and an increase in the number of out-door paupers; the numbers both of in-door and out-door paupers exceeded the average for the fourth quarter of the preceding ten years.

The births registered in Ireland during the last three months of 1882 were 27,971, which were equal to an annual rate of 22·0 per 1,000 of the population, estimated at 5,088,079 persons; this rate was 0·9 per 1,000 below the average rate in the corresponding period of the five years 1877-81. In the four provinces of Ireland the birth-rates last quarter were 21·1 in Connaught, 21·2 in Munster, 21·9 in Ulster, and 22·0 in Leinster.

During the fourth quarter of 1882 the deaths registered in Ireland were 22,636, equal to an annual rate of 17·8 per 1,000 of the estimated population, which exceeded by 0·6 per 1,000 the average rate in the corresponding quarter of the five years 1877–81. In Leinster the death-rate was 20·7, in Munster 16·3, in Ulster 18·4, and in Connaught 12·7.

The 22,636 deaths registered in Ireland during the last three months of 1882 included 451 from 'fever,' 409 from scarlet fever, 339 from diarrhœa, 324 from measles, 240 from whooping-cough, 94 from diphtheria, and 6 from small-pox. Thus 2,641 deaths resulted from these principal zymotic diseases, equal to a rate of 2·1 per 1,000 of the population, against 2·4 per 1,000 in England and Wales from these diseases during the same period. The fatality of measles, scarlet fever, and whooping-cough showed a marked increase upon that in the preceding or third quarter of the year, and, with the exception of small-pox and diphtheria, the deaths referred to each of these seven principal zymotic diseases considerably exceeded those returned in the corresponding quarter of 1881. In the forty-eight urban sanitary districts of the country (including

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Dublin) the death-rate from all causes during the quarter under notice was 26·7 per 1,000, and the zymotic rate 3·2; in the rural sanitary districts the general death-rate did not exceed 15·2, and the zymotic rate was but 1·0. In Dublin, which consists of nine urban districts, the death-rate from all causes was 25·9, and the zymotic rate 2·1.

The number of emigrants who left Irish seaports during the fourth quarter of the year was 10,946, and was 1,257 in excess of the number in the corresponding period of 1881. According to the Board of Trade Returns, the number of emigrants of Irish origin who left the various ports of the United Kingdom where emigration officers are stationed, which had been 10,352, 9,829, and 8,504 in the fourth quarters of the three years 1879, 1880, 1881, further declined to 8,484 in the last three months of 1882.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

ASTON RURAL.—The pollution of the wells in many portions of this district by the percolation of sewage matter from dumbwells, &c., is a matter to which Dr. Hickinbotham properly draws special attention. At Erdington, which has a population of 7,380 persons, many samples of suspected water were submitted for analysis, and in almost every instance the water was found more or less polluted. A sewerage scheme for this place is being rapidly pushed on, and its completion will remove to some extent this danger to the public health, although even then it must be some time before the well-water in some parts of the village becomes absolutely free from contamination. At Sutton proper a much needed improvement has been effected by the provision of a public water supply, of which it is to be hoped the inhabitants will avail themselves, since the supply obtained from private sources is far from satisfactory; indeed some of the samples recently analysed were described as 'little less than liquid sewage.' Fortunately zymotic diseases were not present in any severe form during the year, but in referring to several troublesome cases of typhoid, Dr. Hickinbotham complains of the difficulty under which he labours owing to the absence of early information. He thinks that the law ought, unquestionably, to require every householder to report the presence of an infectious disease within a short limit of time; but until this is done, the matter rests almost entirely with the medical men, many of whom in the district render every assistance to the authority, whilst others, unfortunately, see such social difficulties in the way as to make them distinctly averse to give the necessary information. The inclement tate of the weather seems to have been responsible for the increased death-rate, which represented 14·06 per 1,000, against 12·19 per 1,000 recorded in 1881. From all causes there were 259 deaths registered, chest diseases accounting for 77 and phthisis for 43. The health officer notes with satisfaction that his district is to be provided with separate hospital accommodation.

BATH.—Little of interest occurred here during 1882, but Dr. Brabazon's report contains some not uninteresting details. The dissemination of the infection of scarlet fever seems to have been greatly facilitated by the absence of information concerning fresh cases, and Dr. Brabazon makes good use of the opportunity to urge upon his authority the importance of compulsory notification of infectious disease. He feels sure that a system can be carried out without detriment to the honour and position of the profession to which he belongs, and also without any infringement of the liberties of the public regarded as private individuals. The city was visited by recurrent outbreaks of scarlet fever, which occasioned much trouble and anxiety. The total number of cases reported during the year were 204. Of these 109 were admitted to the Statutory Hospital, leaving ninety-five to be treated at home. Most of the latter were unreported cases, or reported so late that removal was useless. The remainder were cases in which compulsory removal could not have been enforced. Among those treated at their own homes the mortality was 22·1 per cent., while the mortality among those treated at the hospital was 4·5 per cent., the difference affording another striking example of the immense superiority of hospital treatment over home nursing. Of the total deaths (1,035) 156 occurred in children under one year, making an average of 3·1 per 1,000, the lowest rate of infantile mortality recorded during the past few years, with the exception of 1875. The general death-rate (corrected) represented 19·5 per 1,000. No sanitary works appear to have been undertaken during the year, and the report concludes with a brief reference to the removal of nuisances.

BRANDON AND BYSHOTTLES.—The principal portion of Mr. Blackett's report is made up of a series of monthly and special statements, the annual report proper being very limited in extent. However desirable this arrangement may be for local reference, it is one that cannot be advocated for general adoption, nor does it seem quite consistent with the regulations of the Central Board. A noticeable feature of the year was the association of meteorological conditions with an increased infantile death-rate, especially in June and December, when these conditions were most noticed. Of the 30 deaths registered in June, 13 occurred in children under five years, principally from whooping-cough and chest diseases, while in December there was a large mortality from acute bronchitis and pneumonia, following an epidemic of measles. From all causes there were 245 deaths registered, yielding a death-rate of 19·6 per 1,000. Mr. Blackett gives details of the completion of some useful work, and he adds: 'With regard to sanitary matters, there would appear to be too great a tendency to advance in front of the times, and not wait for legislative interference or guidance.' This experience is so exceptional that we cannot do better than place it on record.

FROME RURAL.—The chief want of this district is undoubtedly a proper supply of water. Owing to the abundant rainfall of last year, and the moderate temperature of the summer months, this want was not much felt; but the unsatisfactory state of the drinking water in at least two portions of the district was the cause of a slight outbreak of a low form of fever and of a severe case of typhoid. At Nunney a well has been sunk in a convenient spot in the village, from which a good supply can be drawn, but whether this source will in a dry season prove more reliable than others in the village remains yet to be proved. Mr. Parsons thinks that the use of the water will, under the most favourable circumstances, be limited by the distance from which many of the inhabitants will have to fetch it. Some progress has been made towards providing other places with a proper supply of drinking water, but as regards the village of Winstrow the question is at a deadlock, owing to the scheme, which was prepared some years ago, for supplying it proving unacceptable to the ratepayers. Judged from a medical point of view, the history of the year presents few points of interest, and the statistics which are given of the diseases prevalent are so meagre as to preclude any satisfactory deductions being drawn therefrom. Scarlatina of a mild form appeared in several of the villages, but the disease did not at any time assume a serious form. The death-rate is not given in the report, nor is there any general summary of the mortality.

HALIFAX URBAN.—This report is far from complete, regard being had to the extent and population of the borough. After briefly summarising the mortality statistics recorded during 1882, Mr. Ainley proceeds to describe the working of the system of compulsory notification of infectious disease, introduced under the provisions of the Halifax Corporation Act of 1882. From all points the Act seems to have been a complete success, and Mr. Ainley speaks in high terms of its usefulness. A further

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addition to the sanitary defences of the town was the erection of a new small-pox hospital. Scarlatina accounted for 21 deaths, against 102 recorded in 1881, but Mr. Ainley has little of interest to say in connection with the prevalence of this disease. In one part of the town, where the disorder assumed a virulent form, a house-to-house inspection revealed some remarkable defects. The streets were not sewered or paved, excepting for surface water, and there was considerable percolation into the houses. On representation being made of this deplorable state of things, steps were at once taken towards improvement, and the streets are now thoroughly sewered, paved, and drained. The ventilation of the main sewers progresses, as many as 84 ventilators and 25 gullies having been fixed, but the health officer is silent as to any other sanitary work that may have been accomplished. No fewer than 22 deaths, out of a total of 95 recorded from zymotic diseases, were from typhoid fever, and the absence from the report of any account of the circumstances attending this serious mortality must be regarded as a very grave omission. The general death-rate, 20·3 per 1,000 of population, was the lowest recorded in the borough since the establishment of civil registration.

HASTINGS.—An important step in the right direction has been taken by this authority in issuing a code of by-laws, based upon the model prepared by the Local Government Board, with respect to new streets and buildings. These, if strictly carried out, cannot fail to exercise a beneficial effect upon the sanitary condition of the place. Building operations are now being extensively carried on in Hastings; and, looking to the position of the town as a health-resort, it is of the first importance that the erection of dwellings should be subjected to rigid supervision. The number of deaths from the seven principal zymotic diseases (90) was higher than in any year during the last eight years, and represented a death-rate of 2·03 per 1,000; while from all causes, deducting the deaths of visitors, the annual rate of mortality was equal to 13·81 per 1,000. Whooping-cough was unusually prevalent during the first half of the year, as was measles—which seems to have been much complicated with bronchitis. Seventy-three patients suffering from scarlatina were admitted into the Sanatorium, which is now utilised for cases of this disorder, a new building being reserved for small-pox patients. Three cases of variola were reported during the year. In the first and second cases the source of infection was suspected to have come from neighbouring villages, which had been visited by the sufferers in the pursuit of their livelihood. The patients were at once admitted into the Sanatorium, and the energetic measures adopted by Mr. Knox Shaw were successful in restricting the spread of the disease.

KETTERING URBAN.—As in other factory towns, the infantile death-rate in Kettering causes considerable anxiety, and in his report on the district for the past year Mr. Winter Dryland regrets to have to state that notwithstanding all that has been said and done, the infantile mortality from atrophy is again on the increase. The deaths from this cause, which had gradually diminished to eight in 1881, rose to 18 in the year under notice. There is little doubt, as the health officer remarks, that many of these lives might have been spared by proper attention to diet and cleanliness, and abstention from the administration of opiates and soothing syrups. The establishment of crêches in some towns has been productive of good results, and there seems no reason why one should not be started at Kettering. As many as 27 deaths were recorded from measles, all of which, with one exception, were children under five years. Twenty of them died from lung complications, arising, doubtless, from the exceptionally damp and cold weather which prevailed during the time of the epidemic. With this exception, the zymotic mortality calls for little notice. There was one death from typhoid fever, making a total of three during the last six years, a fact to which special attention is drawn as affording satisfactory evidence of the good sanitary condition of the town. An interesting example of the influence of sewer gas in producing illness is given in the report. On investigating the cause of a peculiar outbreak of illness in one part of the town, Mr. Dryland found that all the sink drains were in direct communication with the sewer. Immediately the connections were severed the health of the inmates rapidly improved, and no further cases were heard of. From all causes there were 221 deaths registered, representing a death-rate of 18·4 per 1,000, against 14·0 per 1,000 recorded in 1881. The increase seems to have been due to the mortality from lung diseases, for which the unfavourable state of the weather must in a great measure be held responsible; but the report contains no statistical tables for comparison. Mr. Dryland gives a fairly complete account, in chronological order, of the events of the year, and of the measures taken for the repression of infectious disease, especial reference being made to the immense value of the hospital, which was the means of immediately arresting several outbreaks.

SALTLEY URBAN.—The death-rate of this district, which in 1882 represented 15·18 per 1,000, would seem satisfactory enough, but for the fact that 20 deaths out of a total of 101 were registered from zymotic causes. Excluding the deaths from diarrhœa, which was very prevalent, the zymotic death-rate would be reduced from 3·0 per 1,000 to 2·1 per 1,000. The mortality among infants continues terribly high, for no fewer than 59 children succumbed before their fifth year, 38 being infants who had not completed twelve months of age. Mr. Creswell seems fully impressed with this lamentable state of things, which he attributes to improper feeding; and he is doing all in his power to ameliorate the evil. The termination of the agreement with the Town Council of Birmingham for the reception and treatment at their hospital of cases of small-pox and scarlet fever affords the Saltley authority the opportunity of acquiring separate accommodation for their district, an opportunity which they would do well to avail themselves of.

STROUD RURAL AND URBAN.—Mr. Partridge has but little improvement to chronicle in the sanitary condition of the rural district. Few, if any, of the villages possess a system of drainage, and although much discussion has taken place on the subject, nothing has been done. At Ebley the sewage and refuse drains into the brook and canal, which have virtually become open sewers. At King Stanley there is no pretence to drainage, and the stream from which the water-supply is obtained, is pure at its source and for some distance, but it becomes polluted by receiving the contents of closets, &c. Mr. Partridge regrets that the expenditure of a little money should be considered before the general health, and he reminds his authority that a day of reckoning will come sooner or later, indications of which are already to be found in the many cases of serious illness, and the deaths from year to year of typhoid fever. The deaths from all causes in the rural district (448) represented a death-rate of 15·4 per 1,000. Scarlet fever was epidemic in a mild form throughout the year, and special efforts were made to prevent the spread of this infectious and fatal disease, but, as might be expected from the absence of any means of isolation or knowledge of cases as they occur, with only partial success. Mr. Partridge advocates the notification of infectious disease, but he thinks that the duty must be imposed upon parents, and even then, he adds, ignorance will be pleaded as an excuse for no medical attendance and exposure. Diarrhœa caused 3·3 per cent. of the total deaths, a mortality which, as most of the cases occurred in infants, is accounted for by improper feeding, clothing, &c. In the urban district there are signs of improvement, but the authority have still ample work before them. At the drainage works the tanks are not now large enough for the increased sewage, so that the precipitation and disinfection cannot be properly carried out, and the effluent waters are not so clear as they ought to be. The town is provided with an excellent supply of water, but there seems some difficulty in inducing the people to avail themselves of it. The high death-rate

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[illegible] Mr. Harris, the [illegible] Public Analyst, [illegible] [illegible] Report. We [illegible] [illegible] [illegible]

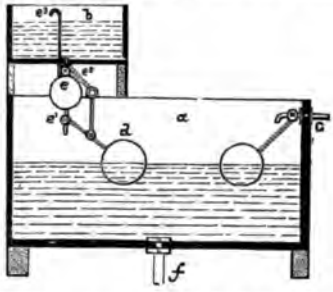
japanned, the rows of chains and springs being carried longitudinally from head to foot, each strand being practically independent of the remainder of the web, and thus a greater amount of elasticity is obtained. For an ordinary bed-

stead they are fixed to a strong wooden frame, a mattress being the only necessary adjunct to them. The elasticity is all that can be desired, and for all hygienic purposes too much cannot be urged in favour of this class of sleeping arrangement. Our illustration represents one of Messrs. Billington's hospital beds, though such an appliance would prove a boon to any household. By simple mechanism one-half of the body can be raised to any angle expeditiously, and with the assistance of only one attendant, and the ready adaptation of the mattress to the slightest movement of the patient materially tends to the alleviation of pain.

ILLUSTRATED SANITARY PATENTS.

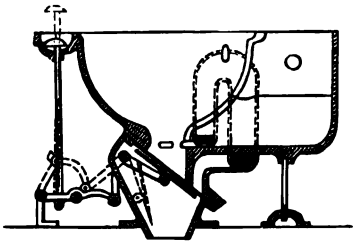
ENGLISH.

4138. (1882.) DEODORISING AND DISINFECTING APPARATUS: G. NORES, Paddington. [6*d*.]—This invention relates to improvements in deodorising and disinfecting apparatus for water-closets or urinals, drains or sinks, and consists of a regulating supply cistern or tap. His improved apparatus is so designed as to be attachable to every description of water-closet, urinal, sink or drain, where other similar appliances cannot be so effectively or conveniently fixed, and to operate in such a manner as to measure a charge of disinfecting fluid for injection.



We represent a mode of disinfecting the water in the supply cistern, and which arrangement is suitable for large establishments. *a* is the water cistern. *b* is a small cistern containing disinfecting fluid. *c* is the ordinary supply controlled by a ball valve as usual. *d* is an additional ball for controlling the admission of a certain quantity of disinfecting fluid to the cistern *a*. *e* is a 'holder' which holds a definite quantity of disinfecting fluid. This holder is fitted with two cocks e^1 e^2. When the ball *d* falls e^1 is turned off and e^2 is turned on. The holder *e* then fills with disinfecting fluid, the air escaping by the small air pipe e^3. When the cistern is again filled up from the supply *c*, the ball *d* rises and shuts off e^2 and opens e^1. This causes the fluid contained in *e* to fall into the cistern *a*, and this quantity of fluid is made of sufficient strength to render the water in *a* disinfectant. *f* is the pipe leading to the closet, urinal, sink or other article to be disinfected.

4430. (1882.) WATER-CLOSETS: J. IMRAY, London, for MESSRS. LECKY & HAY, Pittsburg, Penn., U.S. [6*d*.]—According to this invention, the pan of a water-closet is made in one piece with the service cistern at the side of it, and with a lateral guide for the pull. The upper flange of the pan is made with a face slightly sloping towards the pan so that no liquid can lodge thereon. The bottom of the pan is made with a neck having its face inclined from 30° to 45° downwards, and against this face fits a flap valve, which when it is opened hangs nearly vertical within the throat that is fixed against the inclined lower surface of the pan. The valve is jointed to an internal arm on a rocking spindle which passes through packing in the side of the throat. An external arm of this rocking



shaft is connected through a pair of toggle levers to the pull handle, and these toggle levers have their joints made to butt when their fulcrum pins are in line, so that they cannot be pushed beyond their dead centre. The cistern communicates with the neck of the pan by several rectangular apertures so arranged as to direct currents of water on the interior of the pan neck and of the inclined valve which closes it. Within the cistern is an overflow siphon communicating with the throat below the valve. The cistern is supplied by a service valve governed by a float in the following manner:—To the stem of the valve is jointed the float lever, and to a pin on this lever is jointed one end of a radius, the other end of which is jointed to an adjustable fulcrum carried on a bracket projecting from the valve box, these parts being so arranged that the part of the float lever next the valve and the radius constitute together a toggle joint, which has its pins in line when the float is raised, the valve being then firmly closed. When the float descends bending the toggle joint out of line the valve is opened.

4509. (1882.) DRAIN PIPES: F. H. NOOT, London. [4*d*.]—This invention has for its object an improved construction of drain pipes, whereby they are rendered more easily accessible for the inspection or clearing of the drain, or in case of breakage, than is the case with the present system of pipes.

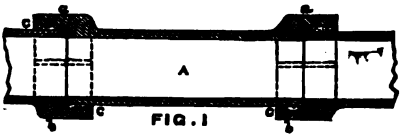


FIG. 1

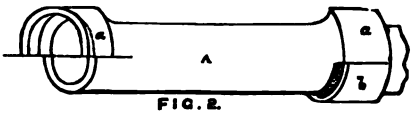


FIG. 2.

Fig. 1 is a longitudinal section of a series of drain pipes constructed and arranged on the principle of this invention, and fig. 2 a perspective side view thereof (partly broken away).

This invention consists in forming both ends of each length of drain pipe AA^1, with a half flange or faucet *a* or

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b in lieu of with a whole flange or faucet at one end as at present. In arranging a series of pipes on this principle, each alternate pipe A is placed against the intermediate pipes A^1 with its half flanges or faucets *a* uppermost as shown, whilst the half flanges or faucets *b* of the intermediate pipes A^1 will be lowermost. By this means the alternate pipe A at any part of the drain can be directly lifted out and replaced or renewed without any difficulty. The joints *c* of the various lengths of pipe A A^1 may be made in the usual way, and this invention is equally applicable to pipes composed of earthenware, iron, or any other material.

4727. (1882.) TRAPPING SEWERS AND DRAINS: W.A. BARLOW, London, for L. HENRY, Brussels. [6*d*.]—This invention relates to certain improvements in trapping sewers and drains and in traps therefor, and consists of

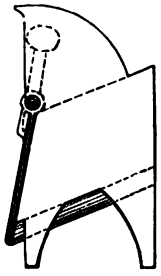


FIG. 1

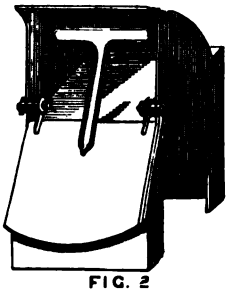
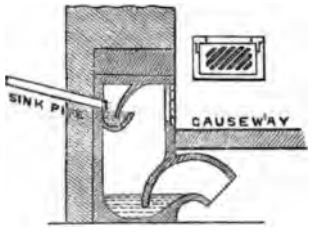


FIG. 2

an apparatus for use in branch sewers connecting the houses with the sewers. It has for its purpose to allow the matters or liquids entering the main sewers but prevent them re-entering the branch sewers, when by flood or any other cause the level in the main sewer rises and causes the matters to run back into the houses.

The apparatus is composed of an oblong box open at both ends and connected with the branch sewers at their exit from the houses. The end towards the branch sewer is furnished with a balanced lever door, the said door resting on the two sides of the box and closes this sewer, the weight which operates this door is outside the case and is screened by a hood formed of a piece with the case. The equilibrium of the door is calculated in such a manner that the least pressure from the interior of the sewer makes it swing.

5041. (1883.) IMPROVED SEWAGE TRAP OR GULLEY: E. GREEN, Halifax. [6*d*.]—This invention has reference to that class of trap called house and yard traps and generally employed in connection with houses to trap from the sewers. The form of the exterior of the trap may be of

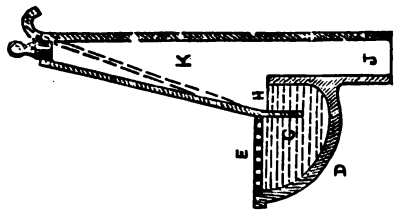


any shape. In the interior he forms two traps, one at the top where the inlet is situated, and another at the bottom where the outlet is situated. Above the outlet he places an iron frame and grate with hinges so as to get at the inside of the trap for the purpose of cleaning out; or (if preferred) in place of a frame and hinged grate. He uses a pot or iron shoe grate, made to fit an opening in the trap, which can be put in and taken out when the trap requires cleaning.

On the outlet pipe is made an opening covered by a lid for the purpose of introducing a cleaning rod to clean out the pipes connected therewith. This kind of trap is especially applicable for all houses where there is no front line, or where they are built back to back, and where the trap is required to be under the wall. He uses a dish stone made with a lip or spigot underneath to fit into the socket of the trap. The outlet of the trap may be connected with the sewer by means of an ordinary socket pipe.

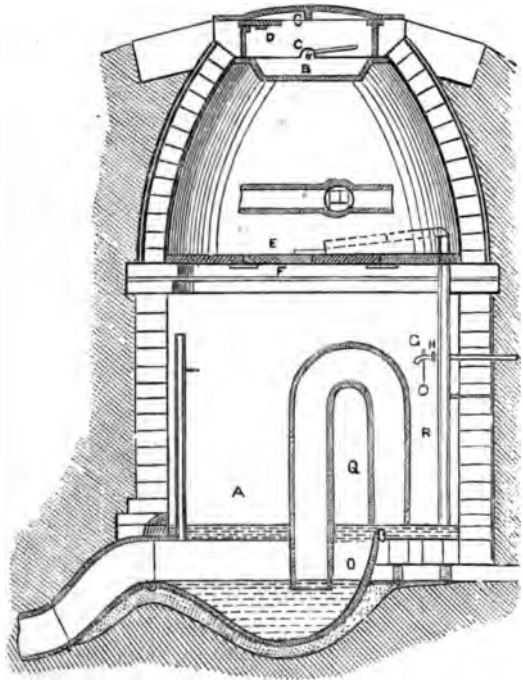
AMERICAN.

273,780. SINK: JOSEPH A. TALPEY, Somerville, Mass. Filed Oct. 6, 1882. *Claim.*—A cast-metal sink



having a trap integral therewith consisting of the basin D, provided with a removable strainer, E, the tube K, having an opening at the top closed by a plug, the guard G, the dam H, and the pipe J.

272,992. SEWER FLUSHING APPARATUS: WILLIAM H. VIBBARD, Kalamazoo, Mich. Filed Dec. 27, 1882.—This is an improvement on Letters Patents No. 262,860, dated Aug. 15, 1882. The valve of the water main cock



is provided with two ports at right angles to each other, and the flow of water through the same is regulated by a float. The syphon is provided with an air cock to admit air to the short leg of the same. The top plate of the trap is formed with an opening for the syphon and a socket for the air pipe leading up into the tank. The frost doors are hinged together in sections and rest on a projecting ledge around the inner side of the tank.—*Claim.*—The combination, with the tank A, syphon Q, and trap O, of the cocks, provided with a float to open it as the water rises. 2. The combination, with the tank A, of the cock G, pro-

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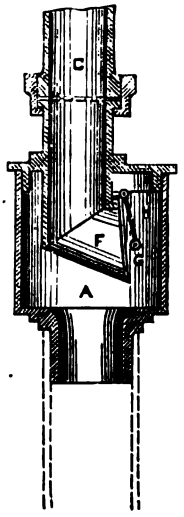
vided with an automatic device constructed to open the passage through the cock as it rises, and as adjusting device to regulate the flow of the water through the cock as the plug returns to its normal position. 3. The combination, with the tank A, of the cock G, having plug H, moved by the float J, and provided with apertures at right angles to each other. 4. The combination, with the tank A, of the trap O, syphon Q, and air cock R. 5. The combination, with the trap O, of the plate N, provided with an aperture for the syphon Q, and a socket for the pipe L. 6. The combination, with the tank A, having the edge F, of the frost doors E, formed of sections hinged together for removal or replacing. 7. The combination, with the tank A, having collar B, of the cover C, provided with the lug C, and lock D.

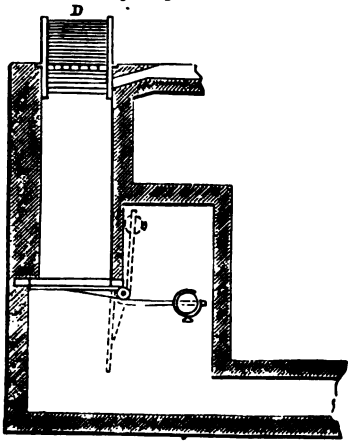
274,139. STENCH-TRAP: HERMAN PIETSCH, Flatbush, N.Y. Filed July 3, 1882.

Claim.—1. In a stench trap, the combination, with the box or vessel A, of the inlet-pipe C, provided with an elbow, F, at its lower end, the gate E, and the strip or plate



H, hinged to the same and to the pipe C at a point above the elbow. 2. In a stench-trap, the combination, with box or vessel A, of the inlet-pipe C, and the gate G, hinged by a double-jointed hinge.

274,149. SEWER-TRAP: HARRY C. STEWART, Harrisburg, Pa. Filed Sept. 25, 1882.



Brief.—The port hole of the valve seat flares outwardly to facilitate the ready washing out of sand, &c., that accumulates.

Claim.—1. In a sewer or other valve the combination, with the valve casing or masonry and a downwardly opening valve held to its seat by adjustable weights, of a valve seat plate having an outwardly flaring valve port, all constructed and arranged for co-operation. 2. In a sewer valve the combination, with the valve casing or masonry and a downwardly opening valve held to its seat by adjustable weights, of a seat plate having an outwardly-flaring valve port and the superposed grating D, all constructed and arranged for co-operation.

REVIEWS.

La Médecine Publique en Angleterre. Par Walter Douglas Hogg. Paris: G. Masson. 1883. Pp. 177.

DR. HOGG, an English physician domiciled in Paris, has attempted in this book to give, for the benefit of the country of his adoption, a sketch of our English public health system. No doubt this system appears to an outsider a highly complicated one; and allowances must therefore be made for Dr. Hogg, when he unconsciously exaggerates the importance of certain of the factors of the system, and leaves others altogether out of consideration. How accurate is his picture of our sanitary organisation may be gathered from the following extracts.

The English public health laws began by certain individual municipalities obtaining special powers in their local acts to deal with sanitary matters. Neighbouring towns adopted these regulations in course of time, and at length the State was obliged to step in and make the particular requirements of general application. The Government is much hampered by the independence of Corporations. None of the laws affecting sanitary matters are obligatory: the local authority can adopt them or reject them at its option. It is the custom for the authority to convene a meeting of the ratepayers to discuss whether a particular law shall be applied in the district. Says Dr. Hogg, 'Ces coutumes peuvent paraître bizarres à des Français,' though they could scarcely be more *bizarre* to Frenchmen than to Englishmen who know the facts. A chapter on the history of hygiene in England attributes to *William* Jenner the discovery of vaccination, and says that vaccination was first made compulsory in 1867 (instead of 1853). The medical officer of health, according to Dr. Hogg, rarely has any private practice, having no leisure from his public duties, which take up all his time. Towns of 15,000 inhabitants and upwards may have more than one officer of health. The health officer has power to confiscate and destroy any unwholesome food, and he has, *ex officio*, a right to assist in the deliberations of the sanitary authority. His salary may vary from 80*l.* to 1,250*l.*; but in districts of 10,000 population or less, it is generally fixed at 100*l.* a year. Free from any private occupations, he has in relation to the local authority a position which leaves him entire liberty of action. The measures which he proposes are, with rare exceptions, always adopted without discussion. He is the pivot of the entire system, the keystone on which depends the whole building. The inspector of nuisances, amongst other remarkable duties, lends powerful help in the suppression of adulteration of food by collecting every day a great number of samples for transmission to the public analyst. The functions of inspectors are sometimes assumed by the medical officer where the district is a small one. The office of surveyor, which is highly remunerated, and which can only be attained by recognised personal merit, is much sought after.

With this, and much more of an equally fanciful kind, Dr. Hogg entertains his reader, and it will be small wonder therefore if the latter rises from the book with a profound conviction that they manage these things better in England. There is a chapter comparing the French sanitary system with our own that contains much of interest for a sanitary student on this side of the Channel.

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There seems to be plenty of regulations concerning the public health scattered through the statutes of France; but unfortunately there is no organisation to put them in motion. Dr. Hogg's book is intended as a help towards the inauguration of a proper system for giving these laws effect, by showing what has been done in England. It is a pity that the author did not take some steps to perfect his knowledge on the subject before publishing so inaccurate and incomplete an account of our system as is contained in the present work.

Annual Report of the Board of Health of the State of Louisiana for the Year 1881.

THE peculiar geographical position, climate, and commercial relations of Louisiana give to these Reports a special value in the solution of several questions as to the etiology of tropical fevers, and the means whereby their importation may be prevented. Though situated at the lower end of the great valley of the Mississippi, and including the whole delta of that river, its surface presents every variety, from wide lagoon and swamp to wooded hills, prairie, forest, and arable land of every kind. While the summer temperature equals that of Vera Cruz or Havanna, the winter and spring are from 6° to 11° cooler than these, and indeed are lower than at Charlestown, two degrees further north. In some districts the summer, in others the winter, rain-fall is the greater, the total annual depth at New Orleans varying from 40 to 100 inches, and the humidity from 80° to 88°, according to the season. Vegetation is luxuriant, and the health of the population, in the absence of epidemics, is decidedly good. The heat of summer is relieved by fresh winds and frequent fluctuations, while in winter, light frosts and falls of snow render the climate healthy and invigorating.

Yellow fever demands for its origination and spread a temperature ranging between 70° and 85°, such as is found in the hotter months; but the approach of cooler weather invariably checks, and the winter completely arrests, its progress, so that, however fatal an epidemic may be, the disease cannot become permanently endemic, and its presence must always be owing to actual importation: its prevalence, too, does not depend solely on the temperature, some of the hottest seasons having been remarkably free, when energetic measures had averted its introduction from without. Still less can any relation be shown to subsist between the amount of rain-fall and the increase or decrease of the fever.

A careful study of the history of the last twenty years has convinced Dr. Joseph Jones, the able President of the Board of Health, that it is only by a rigidly enforced system of quarantine, involving a detention of ten days, irrespective of the time that a ship has been at sea, and combined with other precautions—as the breaking up of the cargo immediately on arrival and attention to the personal cleanliness of the crew—that the importation of yellow fever can be prevented. In the case of ships in a foul condition, or on board of which cases have occurred during the voyage, thorough disinfection, cleansing of the bilge, and saturation of the hold, &c., with carbolic acid, followed by tarring of the wood-work, wherever possible, must be enforced, and in no instance may apparently healthy persons be allowed to enter the town until the term of detention has expired. Like most of our epidemiologists, he is now convinced of the uselessness of so-called disinfection *per se*, yellow fever having repeatedly raged while sulphur, carbolic acid, and sulphate of iron were lavishly employed. The fever has a period of incubation, ascertained in some cases to have been from six to nine days, which must be reckoned from the clearing of the cargo and opening up of the holes and corners where the germs may have lurked.

Quarantine is constantly opposed by the commercial class in New Orleans, with whom the Board of Health have to maintain a ceaseless struggle; but more than once, when after a period of immunity due to strict adherence to these principles a false security has been created, and the rules relaxed by reckoning the time that has elapsed since a ship left an infected port, and reliance has been placed on fumigation of ship and cargo in bulk, the views of Dr. Jones have been proved correct by outbreaks of fever exceeding in virulence those of previous years. Such was the case in 1858, when, after two years of comparative freedom, 2,855 persons died; and again in 1878, when, though every infected house was not only fumigated but 'pumped from top to bottom with carbolic acid, which impregnated the atmosphere for some distance off,' 3,107 deaths occurred, often in houses that had been thus disinfected(?) again and again

Malarial fevers, on the other hand, are never absent; and, as elsewhere, stand in direct relation to the temperature, being most prevalent when putrefactive (?) changes are most active.

The general death-rate of New Orleans exhibits extraordinary fluctuations, depending on the occurrence or absence of epidemics of yellow fever, cholera, &c. In the great fever years it has risen to 68, and even 99, per 1,000; but in others has been as low as 23 to 30, which will compare favourably with any town in the most temperate regions of the old or new world; indeed, if we exclude all deaths from fever, it has never exceeded 47 per 1,000.

It is worthy of note that the periodical inundations of the Mississippi do not seem to be productive of any ill-effects, owing probably to the remarkable purity of its waters, which, after the subsidence of suspended earthy particles and evaporation, yielded a residue of 11·9 grains only of saline matter, chiefly calcium carbonate and sodium chloride, organic impurity being absolutely inappreciable. The suspended matters were about 23 grains in the gallon.

Although the white population, except in 1858, have always suffered more heavily from yellow fever than the blacks, the general death-rate among the latter has, since 1853, exceeded that of the whites in the proportion of 5 : 4, or occasionally even more. Previously to the year named the reverse proportion was maintained, a fact which Dr. Jones does not attempt to explain, nor, indeed, does he seem to notice it. It can scarcely be accounted for by any change in their circumstances consequent on emancipation, for it appeared about ten years before they were thrown on their own resources. The poverty of the lower classes generally in New Orleans may be inferred from the fact that one-third of the total deaths occur in the hospitals, workhouses, or among those attended at the public cost; and one-fifth without any medical aid whatever.

The existence, not of yaws only, but of true leprosy, in Louisiana is a point of much interest. A hospital for lepers was established in New Orleans as long since as 1778. It is also endemic in New Brunswick, and Dr. Jones believes that some at least of the leprosy in Louisiana may be traced to the immigration of French settlers from Lower Canada, driven thence by the harsh treatment they received at the hands of their English rulers. It is not to be wholly explained by the poor living and dirty habits of the bulk of the French population in Louisiana, since it exists in some of the cleanest and most respectable families. Some American physicians are inclined to a belief in its contagiousness.

Before the Civil War, New Orleans had been exempt from any epidemic of small-pox, though a small number of deaths were annually reported; but in 1870, 1873–4–5–6 they amounted to hundreds, and in 1877 to 1,727, with 2,536 recoveries. In fact, during the ten years ending in 1877, one person in six must have been attacked, and this during a time when inspection and disinfection of houses was carried out on a scale never attempted in any other town. Convinced of the utter uselessness of mere sanitary measures to limit the ravages of the disease, the authorities have had recourse to the only effective precaution, vaccination and re-vaccination; and in the last three years small-pox has well nigh disappeared, the deaths

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registered in 1879–80 and 1881 having been respectively 0, 1, and 1. [The smaller number of susceptible persons remaining must, however, be taken into account.]

There is at present no system of sewers in New Orleans, the excreta of 216,000 inhabitants being removed by hard manual labour; and, as Dr. Jones observes, 'It is horrible to contemplate the effects of hoarding up the vast accumulation of filth in this damp, hot, semi-tropical climate. If fluid, it is pumped from the cesspools into air-tight receptacles, all 'dipping' being expressly prohibited for other than solid or 'stiff stuff.' The carts discharge their loads into a 'nuisance house,' whence it is shipped in casks, carried to a point some way down the river, and emptied below low-water mark. But a single 'nuisance boat' is engaged in the service, and the condition of it, and of the nuisance wharf and house, where manual labour is alone employed, is indeed 'horrible to contemplate.'

'The New Orleans Drainage and Sewerage Co.,' recently incorporated, and warmly supported by the authorities, has, with the approval of the Board of Health, determined to adopt the Waring plan, which has worked so successfully at Memphis [*i.e.* a system of cylindrical pipe-drains, no larger than is absolutely required for the conveyance of sewage (surface and rain-water being strictly excluded), with free ventilation by air-shafts at every house and at every junction or change of direction of the mains, and a system of automatic flushing by means of Rogers Field's tanks, but with no man-holes or provision for manual cleaning, which, in fact, is not required in this plan]; and the Board of Health seek to obtain an Act directing the sewage to be conducted in iron pipes, with the aid of steam pumps, to a point in the river 12 ft. below low-water mark.

An important section of the Report is that devoted to a comparison of the common coal gas and the water gas, as now largely supplied to New York, where it bids fair to supersede the other. The Town Council of New Orleans have under their consideration a scheme for the introduction of this gas into their city. The general conclusions are, that water gas of an illuminating power of 24 candles can be supplied at a cost of 30 per cent. less than coal gas, of far greater heating power, and freer from tarry matter than the latter. It had been asserted that water gas contained more carbonic oxide, but the amount present in that supplied to New York is 6 per cent. [the same as Roscoe finds in Manchester, and only half that contained in some French gas], while it is absolutely free from sulphur compounds, which alone is a matter of the highest advantage.

There is a long and in some respects valuable report on the action of certain poisons; and the difficulties attending legislation on the sale of poisonous substances, which are largely used in commercial and manufacturing purposes, are fully discussed. The law is more stringent than it is in England; one clause, enacting that 'No person shall sell or offer for sale any poisonous drugs, medicines, or chemicals, except on a prescription or written order of a physician'—as the poison label is an additional not an alternative precaution, the reference to it might obscure the sense—must in practice be hard to carry out. [It is not stated whether there be any schedule, or whether the wholesale supply of chemicals to manufacturers is excluded from the action of this clause.]

There are elaborate tables of statistics; but a great part of the volume is occupied by by-laws, correspondence, and other matters of merely local and temporary interest.

Annual Report of the Board of Health of Bukarest for the year 1881. By Prof. T. FELIX, M.D., Vice-President of the Board.

We are so much in the habit of regarding the civilisation of eastern nations, not excepting the outlying members of the European family, as a merely superficial polish, a matter of ironclads and high hats, that we hail with pleasure the evidence of a real appreciation of the importance of sanitary reform in the young kingdom of Roumania.

The capital had in 1881 a population of 200,000. The deaths were 4,868 or 24·3, and the births 5,875 or 29·3 per 1,000. This excess of births over deaths has only been observed twice before in the last fifteen years, viz., in 1869 and 1876. But this unsatisfactory state of things is due not so much to bad sanitary surroundings as to the improvidence of the working classes, and the constant influx from the country of young persons ignorant of any regular trade and earning a precarious livelihood as hawkers and costermongers. The dwellings of the poor also call urgently for improvement.

Infant mortality is very high, 43·6 per cent. of children dying before the completion of their fifth year. The proportion of illegitimate to total births, which in the whole country is 3·49, in the rural districts 1·96, and in the provincial towns 8·47, reaches in the capital the enormous proportion of 20 per cent., which, coupled with the frequency of divorce—about one dissolution of the marriage tie to every forty families annually—reveals a fearful state of immorality pervading, we believe, all classes.

The Board of Health consists of the mayor for the time being as honorary president, the city physician, Dr. Felix, as vice-president and real head, together with the nine district surgeons, five public vaccinators, a medical superintendent of orphans and foundlings, a chemist, two veterinary surgeons for the market and public slaughter-house, the city architect, and city engineer. On the district surgeons devolve the sanitary supervision, the registration of deaths, and certain medico-legal duties in their respective districts. Employed by the board are five midwives, a registrar of orphans and foundlings, commissary of prostitutes, secretary, clerks, &c.

Until recently there had been no system of sewerage; cesspools sufficed for private houses, and open gutters, or in a few streets small drains carried the surface waters and the waste of the manufactories springing up in different parts of the town to the river, these foul waters causing an intolerable nuisance and injury to health. Now, however, a network of sewers traverses the whole city, and empties itself into the river some distance below by twin culverts. The cesspools have not yet been abolished, nor, indeed, are the sewers yet used, except in some of the best quarters, for the removal of excreta; but the change will be carried out as time and funds allow. The street sewers are ventilated by iron pipes at every eighty yards, carried above the roofs of the houses, the gulleys in the roadway being secured by syphon traps. Dr. Felix, however, would prefer direct ventilation into the street.

The contents of the cesspools are at present removed by pneumatic apparatus, and emptied into the river below the town, for, as in Hungary, the fertility of the soil is such that meadows and cornfields are never, and vineyards and even market gardens rarely, manured. This presents a serious obstacle in the way of any scheme for the utilisation of the sewage.

A scheme for the supply of Bukarest with pure water from a point on the river some miles above the town was commenced in the summer of 1881.

Seven of the seventeen cemeteries belonging to the nine different religious communities, the barracks, prison, and hospital, have mortuaries, to which the corpses of persons dead of infectious disease are conveyed. A public disinfecting station for bedding, &c., is now open.

Strenuous efforts are being made for the improvement of the dwellings of the working classes, and a code of by-laws for new buildings is now in operation. Offensive manufactures, as tallow boiling, glue works, tanneries, &c., are being removed beyond the city bounds as rapidly as possible; but facilities are now afforded for the immediate rendering of the fat and boiling of glue at the public slaughter-house.

A food laboratory has been for some years in active work; an excess of lime salts, indicating 'plastering,' incurs the forfeiture of a wine, whether home-made or

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imported. The use of lead is criminal, and fictitious wines which, under various spurious brands, enter so largely into our consumption, are, when detected, confiscated. The alcoholic strength of the brandies in current use is low, viz. 15–18 per cent.; but, as retailed by small dealers, their quality is execrable, 0·43 per cent. of amylic alcohol and 0·067 of sulphuric acid being often present. The use of crude corn or potato spirit for brandy is now strictly prohibited throughout the kingdom.

A register is kept of milk farmers and dealers, and no milk is allowed to be brought into or sold in the town except in vessels marked by the municipal authorities with numbers indicating the producer and vendor as entered in the register; and cattle and meat are subject to inspection at the market and slaughter-house. Oleomargarine is not allowed to be sold as butter.

Vaccination, free and compulsory, is rarely evaded, and re-vaccination is now extensively performed. The lymph used is mostly human, but the Government stock is renewed twice a year by retrovaccination of the calf. A private station exists at present for the supply of animal lymph, and the Government intend establishing a second at the Veterinary School.

Orphans and foundlings are put out to nurse with respectable married women who receive 12 francs monthly for each child. The State also provides shoes and clothing, and pays the school fees. The children are frequently visited by their medical superintendent, the registrar, and a lady visitor, and at least once a year every child appears before the city physician.

There is a well-organised system of poor law medical relief, and prostitution is, as in many continental towns, under State regulation and medical inspection.

So high is the mortality among infants from diarrhœa, dysentery, marasmus, convulsions, and other consequences of improper feeding, that the Board have issued a popular treatise on the management of children for gratuitous circulation. Diseases of the respiratory organs constitute 15 per cent. of the total mortality; diphtheria stands high among the causes of death, 0·7 per 1,000 living, and enteric 0·8 to 1·2 per 1,000; but it is hoped that the sanitary improvements in progress will be followed by a diminution in the deaths from these causes as has already been effected in those from malarial fevers.

On the whole, while the report presents a dark picture of the moral and physical state of the population, it shows also an intelligent and earnest determination on the part of the authorities to inaugurate a very different future for the capital of the new kingdom.

THE *Midland Medical Miscellany* states that the Health Committee for Sheffield decline to accept the offer of the Local Government Board to provide 400*l.* per annum towards the salary of 800*l.* for a medical officer of health, because that course would not leave the treatment and control of that official in the hands of the committee. The Local Government Board would acquire a control over the relations between the committee and their official. The latter body have determined to have an officer at 500*l.* a year out of the rates, and all to themselves. The following advertisement appears in the *Sheffield Daily Telegraph* of August 18:—'By the Health Committee.—Wanted, a Dog (any kind of Cur will do), to watch over the health of the town. Scent not required. Must be able to Beg and Fawn, and be up to all tricks. Must also have his teeth drawn, and stand kicking without a snarl. Will be provided with a Corporation collar and muzzle, and will always be kept on the chain. As a decent living is not provided, the successful animal must cadge for his food. He will be required to show complete subserviency to THE DOGS IN OFFICE.'

THE Corporation of Gateshead have accepted the tender of Messrs. J. P. Batch & Co., of Norwich, for cleansing the ashpits of that borough, at a cost of 3,893*l.* per year.

SANITARY JOTTINGS.

SANITARY.

AN UNSANITARY PIT VILLAGE.—The Durham county magistrates have recently ordered forty-nine houses at Bronpark, belonging to the North Brancepeth Coal Company, to be closed on account of their being unfit for human habitation.

The excessive death-rate recently exhibited by Newcastle is exciting the attention of the authorities of that city, who are unable to account for it. A local paper ascribes the high mortality to overcrowding, consequent on the eviction of thousands of working-men from their homes to make room for street improvements; no provision having been made by the Corporation for housing the poor people thus unceremoniously turned out of their dwellings, who had to seek refuge as best they could.

Several cases of small-pox are reported from Gateshead, though not such as to cause any grave apprehensions. The general death-rate of that borough for the month of August showed an average of 18·4 only in the 1,000. In consequence of the appearance of small-pox in Sunderland, the authorities have provided additional hospital accommodation, with the view of being better able to cope with the disease.

A Sanitary Inspection Association has been formed at Sunderland, Mr. W. L. Byers being appointed secretary.

At a recent meeting of the Newcastle Board of Guardians, the chairman drew attention to the frightful infant mortality. He believed the way babies were treated amounted to cruelty, or at least to gross carelessness, that was disgraceful to their common civilisation. Another speaker attributed it to improper feeding and uncleanliness, and said it certainly was frightful to see the way poor children were often neglected by their mothers. The best sanitary regulations availed nothing in such cases. If a landlord cleaned a place and put it in thorough order one day, he often received a notice from the authorities to do it again next, through the action of dirty and unscrupulous tenants. He thought the real offenders should be made to suffer, and not the unfortunate landlord.

After repeated efforts, the Wallsend Local Board have failed to secure a suitable building in the district for the purpose of a hospital for the proper isolation of infectious cases or even ground for the erection of one; owing to the antagonism shown by property owners. In the meanwhile small-pox is spreading with rapidity—the death-rate of the township for the past month showed an average of 33·4 in the thousand. In their dilemma the Board have applied to Government for compulsory powers.

A new ambulance car has been built by Messrs. Atkinson and Philipson, of Newcastle-on-Tyne, to the order of the corporate authorities of that city, and under the direction of Mr. Henry Armstrong, medical officer of health. The new vehicle is a great improvement on those generally used; accommodation is provided inside for three patients—two lying and one sitting—and two nurses, as well as for one attendant and the driver outside. Everything is so thoughtfully and ingeniously contrived that there is no danger of infection; the patients can be removed with facility, without being touched by the attendants. Provision is made for securing perfect cleanliness. It is admirably adapted for the purpose for which it is intended.

Cases of white lead poisoning are continually being brought before the notice of the Newcastle and Gateshead Board of Guardians by sufferers becoming chargeable to the rates. The prevalent opinion seemed to show that, as a rule, employers had made satisfactory provision for the safety of their hands, but the difficulty was in persuading the hands to avail themselves of the remedies provided for their benefit.

On August 8 the new addition to the Newcastle Workhouse was inaugurated. It has been erected on the site of the old offices which were pulled down in consequence

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of their inconvenience and unsanitary condition. The new block comprises an excellent suite of reception rooms, baths, and conveniences for the disinfecting and storage of paupers' clothing, with committee room and officer's residence; the whole having been erected at a cost of about 7,000*l.*

The Tyne Port Sanitary Authority are using extreme vigilance to prevent the importation of any cases of cholera into the Tyne. A galliot has been provided for additional hospital accommodation, and ample provision has been made for emergencies. The health of the port so far has been very satisfactory; the popular watering-place of Tynemouth only showing an average death-rate of 10 in the 1,000 during the past month.

The Rural Sanitary Authority of Maldon are about to carry out works of main sewerage at Burnham, and to extend the drainage of Southminster, from the plans prepared by Mr Alfred B. Brady, A.-M.I.C.E., who is also preparing schemes for the drainage of the villages of Tillingham and Steeple, which is very urgently needed.

SEWERAGE.

MARKET HARBOROUGH DRAINAGE.—The main sewerage scheme for the united districts of Market Harborough and Great Bowden, in Leicestershire, and Little Bowden, in Northamptonshire, is now completed, at a cost of upwards of 16,000*l.* The work consists of over nine miles of pipe sewers, varying in diameter from 9 in. up to 24 in., together with elaborate flushing arrangements, and other works in connection with the sewers, including several river and brook crossings. The sewage is conveyed by gravitation to land adjoining the river Welland, about two miles below Market Harborough. This land, twelve acres in extent, has been prepared for irrigation and intermittent filtration, and is now in full working order, growing crops, and delivering an effluent quite clear. The work of forming and connecting the private drains has been going forward during the past six months, and is now making rapid progress towards completion. The work is in almost all cases being carried out by the Local Board for the private owners, under the direction of the surveyor to the board. The old sewers are being utilised for storm-water, thus forming a duplicate system, to the great relief of the sewage disposal area, and a contract has been recently let by the Local Board for works to supplement these old sewers, in order to more efficiently deal with the storm-waters falling on portions of the district. The contractor for the whole of the contracts is Mr. G. Stevenson, of Eckington, and he has carried out the work under the direction of Mr. E. G. Mawbey, the surveyor to the Local Board; Mr. J. B. Everard, of Leicester, acting as consulting engineer.

LEGAL.

BAD MEAT CASES.—An itinerant butcher at Nelson has been sent to prison for a month, with hard labour, at the instance of Mr. Dent, inspector of nuisances, for selling unsound meat.

A Liverpool provision dealer has been fined 40*s.* and costs for selling 'butterine' containing 80 per cent. of beef fat as butter. For the defence it was contended that the article was labelled 'with butterine;' but the 'label' consisted of a slip of paper with the words 'with butterine' pencilled upon it, which was tied up in the parcel, and the magistrates held that this was not a label within the meaning of the Act.

WATER SUPPLY.

THE LONDON WATER SUPPLY.—On the 21st ult. the Home Secretary, in reply to a deputation respecting the London water supply, said he considered Sect. 52 of the Water Act of 1875, which the deputation desired repealed, was a great hardship, as it excluded local sanitary authorities from providing themselves with water if they desired to do it independent of water companies. As to the purchase of the water companies, he said that he, as a ratepayer, would not be a party to giving 30,000,000*l.* for that which could be better supplied for 15,000,000*l.*

WATER SUPPLY OF WOKING.—On August 21 the new waterworks at Clandon, designed to supply Woking and the district adjoining with water, were formally opened. The works have been carried out by the Woking Water and Gas Company, and are situated in a field on the hills at Clandon, several miles distant from Woking station. The supply is obtained by pumping from the chalk formation of the hills; and, besides the requisite pumping machinery, there is a reservoir. The opening ceremony, which consisted of the setting of the pumping machinery in motion, was performed by Lieut.-Colonel Galt, the chairman of the company, who said that the pumping machinery would supply all the water required by the district, and the London and South-Western Railway Company would be supplied at their Woking station. A number of gentlemen connected with the company afterwards sat down to luncheon in the hall of the Dramatic College, Woking. In proposing the toast of 'Success to the Company,' the chairman said that the population of the district was about 20,000, and the object of the company was to bring to the homes of the people a good supply of drinkable water. The surface wells from which the inhabitants had obtained their water for domestic use had been found in many instances to be much polluted, and such a supply as that which was now instituted would be of great sanitary advantage to the district. The supply given by the company would be a constant one, night and day. He thought the company might fairly look forward to 4 per cent. dividend after their works were in complete operation. To the toast of 'The Rural Sanitary Authority,' Dr. I. Smith (medical officer of health) responded, pointing out the value of the new supply of water to the Woking district, in which a number of surface wells had had to be closed owing to the water in them having become unfit for domestic use. He also dwelt upon the fact that a good supply of water was essential to the health of a community. The works have been carried out by Mr. R. A. Meyer, contractor.

THE NEW WATER SUPPLY FOR LIVERPOOL.—The water engineer of the Liverpool Corporation, Mr. George F. Deacon, has issued his report of the progress of the new works on the River Vyrnwy, in Montgomeryshire. It states that the embankment now being constructed across the valley of the Vyrnwy will impound the upper waters of the river, and will form a lake, having an area of 1,115 acres, at an elevation of 825 feet above the mean sea level. The length of the embankment from rock to rock will be about 1,255 feet; its height from the original river bed to the ordinary top water level about 84 feet, and to the parapet of the roadway to be carried on arches along the embankment, about 98 feet. It is being formed of rubble masonry set in Portland cement, founded upon sound rock of the Caradoc beds in the Lower Silurian formation. The rock extends across the valley and up both sides. The greatest depth of its surface below the river bed, within the area to be built upon, is 60 feet; so that the total height of the masonry above the lowest part of its rock foundation will be about 158 feet. The formation of the statutory roads which will skirt the lake is progressing favourably. About 5,137 lineal yards have been completed, and a further length of 5,089 lineal yards is nearly formed. The construction of the bridge to carry the road on the south-west side over the Afon Herddydd has been commenced. The aqueduct from the intended Lake Vyrnwy to the present Prescot Reservoirs of the Corporation is 67½ miles long. It consists of three tunnels, through which the whole expected yield of the works may be passed without pipes, and of three lines of parallel pipes, only one of which, with a few short exceptions, will be constructed at present. The discharging power of each line of pipes will not be less than 13,000,000 gallons per day. The Hernant Tunnel, 2 miles 473 yards in length, is being constructed from the intended lake to the Hernant Valley. It will form the first part of the aqueduct. The

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inlet end was driven and timbered by Corporation men, through earth and loose rock to moderately sound rock, for a length of 128½ lineal yards. The outlet end was similarly driven and timbered for a length of 267 yards, and was lined with concrete and brickwork. For the driving and, where necessary, the lining of the intermediate portion, 3,597⅓ yards in length, a contract is being carried out by Messrs. J. W. and M. H. Larmuth, of Manchester. This work is being done by blasting, and the shot holes are drilled with machines worked by compressed air. The total length of the tunnel now driven, but not completed, is 1,275½ yards. From the outlet end of the Hernant Tunnel to the intended Parc Uchaf relieving tank the length of pipe line is 7 miles 177 yards, and this portion of the aqueduct, with the exception of certain special work, has been completed. From the Parc Uchaf relieving tank to the inlet end of the Cynynion Tunnel the length of pipe line is 6 miles 283 yards, and this also has, with the exception of special works, been completed. The length of the Cynynion Tunnel will be 1,515 yards. Between this tunnel and the inlet of the Llanfarda Tunnel, a distance of 165 yards, lies the Morda Valley, which will be crossed by inverted syphon pipes, carried over the river by a small masonry aqueduct. The length of the Llandforda Tunnel will be 1,614 yards, of which 390 yards have been driven but not completed. From the Oswestry Filter Beds to Malpas the distance is about 17½ miles, and about four miles 1,486 yards of pipe line have been laid. From the Malpas Tank to the Cote Brook Tank, a length of about 11 miles 1,033 yards, the construction will be generally similar to that of the last length. From Cote Brook Tank to Norton Water Tower, a length of about 10 miles 1,720 yards, the construction, except beneath the River Weaver, will be generally similar to that of the two last lengths. About four miles 699 yards of pipe line have been laid. From the Norton Water Tower to the existing Prescot Reservoirs, a length of about nine miles 475 yards, the construction, except beneath the River Mersey, will be similar to the last three lengths. About six miles 1,220 yards of pipe line have been laid.

CORRESPONDENCE.

[All Communications must bear the signature of the writer, not necessarily for publication.]

DUSTBINS.

In a leader in the SANITARY RECORD for August (see page 62), you observe that now that attention has been drawn to the importance of a prompt removal of all refuse, it may be expected that local authorities generally will pay special attention to this part of their duties.

Perhaps it might be useful to mention a few facts likely to be better known to householders and visitors among the poor than to the sanitary authorities, and which show that the work could be carried out in a much more satisfactory way if some alteration were made in the present regulations.

Strictly speaking, dustmen are not entitled to ask for payment of any kind for clearing a dust bin, but they generally do so; and in most gentlemen's houses are given either a glass of beer or *2d.* This has become so much the custom that they now often demand the *2d.* as a right even from poor people, and are unwilling to clear any dustbins where it is not given, the consequence being a serious neglect of sanitary requirements in poor neighbourhoods, as in houses where the landlord is non-resident no tenant cares to be the one to call the dustman and so let himself in for this levying of black mail. In such houses the usual plan when the dustbin is full is for the front parlour tenant to keep a look-out and call for the dust cart next time it passes; but the fear of having to pay *2d.*, or at best only avoiding this after an unpleasant altercation, makes the tenants delay as long as possible, so that the dustbin is not emptied till its contents are rotten and poisoning the air with bad smells.

A lady lately told me what follows about her own dustbin. Knowing that no payment ought to be asked she did not give each time of clearing, but gave the men a present at Christmas instead. At Christmas 1881, having had much trouble from their irregularity in coming—even frequent notice to the authorities had little effect—she said she should give them nothing then, but that if they came regularly she would give her usual Christmas-box at Easter. When Easter came, the men having continued as troublesome as before, she had the good sense to keep to her word and give no present. From that time to this the dustmen have called regularly, and she has had no further trouble, as they see that she is really in earnest.

An experienced relieving officer suggests that each dustman should be made responsible for certain streets, and should be dismissed at once in case of neglect, which in this way would be brought home to the right individual; the men would then come round regularly instead of waiting to be called, and so would have no excuse for demanding any payment.

It would be a benefit to the men themselves if at the same time notice were given to householders not to fee them. If their present wages are not enough the parish should raise them, but odd pence and glasses of beer seldom do anything but harm. A dustman's wife said to me, 'My husband often gets drunk with the beer given him at gentlemen's houses; and he won't refuse it, because they offer him nothing else instead.' It will also be found that the pence given are commonly only spent in getting more drink.

If by judicious arrangement it were made the interest of dustmen to keep dustbins empty, they would no longer shirk their work in poor districts as they are now tempted to do; and in this way a stop might easily be put to what is at present a constant and dangerous source of unhealthiness and disease.

August 22. E. P. B.

TYPHOID FEVER IN KENTISH TOWN.

Dear Sir,—I think it will be of interest at the present time to give you some of my experiences of typhoid fever in Kentish Town, where I lived for some years. Before we went to our abode there, as I afterwards learned by chance when I made inquiries, a man had died in the house of typhoid. We had not been long inmates of it before I found the water very bad. After a good deal of trouble, I learned that the cistern was under the floor of the w.c. There was a deposit of decayed mice some two inches thick, and other carcases of mice floating about. The waste-pipe went direct into the soil-pipe. I complained to the sanitary department of the parish of St. Pancras, and an official was sent. I pointed out the defects to him. He could not or would not see anything wrong. I did not then know as much of sanitary matters as I do now, or I should not have stopped in the house. A few months later my wife and two children had typhoid fever badly enough, but all three recovered. I cleared out after that to another house near. Some fr ends of ours went to one close by. They had not been there long before the lodger, a female, suffered from dysentery, and two or three of the children from scarlet fever. My friend lost his child from the latter disease. The place stank horribly, and was infested with rats. This pointed to imperfect brick drains. I made inquiries, and found out that some of the houses close to us had the cisterns under the w.c.'s, and that all the waste-pipes ran into the soil-pipes. Moreover, on carefully inquiring, I found (not giving any reason for the inquiries) that other cases of fever had occurred in the road. I then made a formal complaint to the sanitary department. Then came an official who could find nothing wrong. I again wrote to the department, and was met with a denial of my

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statement that my people had suffered from typhoid fever, and was given a broad hint that my other complaints were unfounded. A good deal of correspondence followed, and I finally threatened to bring the whole matter before a higher authority. This had the desired effect. Notices were served upon the landlord to remove the cisterns into the open air—to open the waste-pipes into the air, and to open up the drains under one of the houses. This cost the landlord a good deal of money. It was found that the drain from the house to the sewer was of brick, imperfect, the ground thoroughly soddened with filth, and a communication into the house where the dysentery and scarlet fever had been so bad. I have no particularly good opinion of that Fleet sewer, which runs under some parts of the district, and most likely under a greater part of the streets in Kentish and Camden Towns where the disease is prevalent. Whether it afterwards finds its way into the Thames, I don't know, but there is under Blackfriars Bridge a large watercourse said to be the Fleet Ditch covered in, though that this can convey sewage is scarcely likely. I fancy if you were to get a map of the course of the Fleet sewer you would find the fever hugging its course pretty closely, and also that a good many imperfect brick drains discharge into it.

A word in conclusion. Previous to my experiences, above narrated, I paid bitterly for my rashness in going into a new house not fifty yards from the Kentish Town Station of the North London Railway. This was twelve years ago. There was a family of four or five of us, strong healthy young men. We everyone had the mumps, most severely, accompanied by serious febrile symptoms. So great was the exhaustion in my own case that I actually had to learn to walk again, after a fortnight of it. A medical friend of ours became interested, hunted about down stairs, and came across an imperfect drain somewhere. Those of your readers who happen to be in the profession, know the miserable lasting effect often produced by this disease in male subjects, especially if leeches are applied.

I hold, possibly in common with some of your readers, a very strong opinion in these cases of almost criminal neglect on the part of those who let houses with imperfections which the expenditure of a few shillings would put right. The man who shoots at me is punished with penal servitude. He who poisons me with foul stinks, kills my relatives, and permanently injures those who escape death, goes scot free! How much longer shall it last?

A. SUFFERER.

COMPETITIONS.

SOCIETY OF ARTS.

THE following prizes are offered amongst others by the Council of the Society of Arts for the year 1883:—

Benjamin Shaw Prize.—1. A Society's Gold Medal, or 20*l.*, for the best plan for 'obviating or diminishing risk to life in the operations of coal-mining.' 2. A Society's Gold Medal, or 20*l.*, for the best plan for 'obviating or diminishing risk to life in the manufacture, storage, and transport of explosives.' The Council leave it to the competitors to bring the plans under their notice in any way they may think proper, whether by model, written description, or otherwise. Howard Prize.—A prize of 100*l.* for the best Essay on the Utilisation of Electricity for Motive Power. Preference will be given to that Essay which, besides setting forth the theory of the subject, contains records with detailed results of actual working or experiment. The Society reserves the right of publishing the Prize Essay. Fothergill Prize.—A Society's Gold Medal, or 20*l.*, is now offered for the best Invention having for its object the Prevention or Extinction of Fires in Theatres, or other places of public amusement.

Designs, plans, models, essays, descriptions, inventions, &c., intended to compete for any of the above Prizes, must be sent in on or before Oct. 31, 1883, to the Secretary of the Society of Arts, John Street, Adelphi, London.

Further particulars relating to the Prizes may be obtained on application to the Secretary.

NEW HOSPITALS ABROAD.

THE term for sending in plans for the new Polyclinic Hospital at Rome, at which foreign architects may participate, has been extended to Jan. 11, 1884.

CONGRESSES.

SANITARY INSTITUTE OF GREAT BRITAIN.

AUTUMN CONGRESS, 1883.

THIS Congress will be held at GLASGOW from September 25 to September 29, 1883.

The exhibition of sanitary apparatus and appliances in connection with the Congress will be held in the Burnbank Drill Hall, from September 25 to October 20.

'Congress Tickets' will be issued entitling the holder to admission to all the meetings, addresses, conversazione, and the exhibition held in connection with the Congress. The price of the 'Congress tickets' is half-a-guinea each. A reception room will be opened at the St. Andrew's Halls, Granville Street, on Monday, September 24, at 1 P.M., and on the following days at 9 A.M., for the issue of Congress tickets, which may also be obtained previous to the meeting, on application to the Secretary of the Institute, or to the Honorary Local Secretaries, 11 Bothwell Street, Glasgow.

The lectures to the Congress, the sectional meetings, and the general meetings will be held in the St. Andrew's Halls. The conversazione will be given in the Corporation Galleries, Sauchiehall Street. The exhibition will be held in the Burnbank Drill Hall, Great Western Road, and will remain open until October 20. The public luncheon and dinner will take place in the St. Andrew's Halls. Hotel and lodging accommodation, and travelling arrangements will be determined by the local committee, and information relating to the same may be obtained on application to the honorary local secretaries.

SRCTIONS OF THE CONGRESS.

Section I.—'Sanitary Science and Preventive Medicine.' Section II.—'Engineering and Architecture.' Section III.—'Chemistry, Meteorology and Geology.'

ORDER OF PROCEEDINGS.

Tuesday, September 25.—1 P.M.—Public Luncheon. 3 P.M.—Opening of Exhibition by the Hon. John Ure, Lord Provost of Glasgow. 8 P.M.—First General Meeting; Opening Address by Professor G. M. Humphry, M.D., F.R.S.

Wednesday, September 26.—Section I.—'Sanitary Science and Preventive Medicine.' 10 A.M.—Address by Professor W. T. Gairdner, M.D., LL.D. 11 A.M. to 1 P.M.—Papers and Discussions on 'Sanitary Science and Preventive Medicine. 2 to 5 P.M.—Ditto. 8 P.M.—Conversazione.

Thursday, September 27.—Section II.—'Engineering and Architecture.' 10 A.M.—Address by Professor T. Roger Smith, F.R.I.B.A. 11 A.M. to 1 P.M.—Papers and Discussions on 'Engineering and Architecture.' 2 to 5 P.M.—Ditto. 8 P.M.—Lecture to the Congress, by B. W. Richardson, M.D., LL.D., F.R.S.

Friday, September 28.—Section III.—'Chemistry, Meteorology, and Geology.—10 A.M.—Address by R. Angus Smith, Ph.D., F.R.S. 11 A.M. to 1 P.M.—Papers and Discussions on 'Chemistry, Meteorology, and Geology. 2 to 4 P.M.—Ditto. 5 P.M.—Closing General Meeting of Congress. 7 P.M.—Public Dinner.

Saturday September 29.—8 P.M.—Address to the Working Classes, by Alfred Carpenter, M.D.Lond., C.S.S. Camb.

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Arrangements will be made for Excursions during the day.

N.B.—The lectures to the Congress, the sectional meetings, and the general meetings will be held in the St. Andrew's Halls, Granville Street. The Exhibition will be held in the Burnbank Drill Hall, and will remain open until Saturday Evening, October 20. Luncheon Tickets, 3*s.* 6*d.* each, Dinner Tickets, 7*s.* 6*d.* each (both exclusive of wine), to be obtained of the Hon. Local Secretaries.

SOCIAL SCIENCE ASSOCIATION.

AT the forthcoming Congress, to be held at Huddersfield from October 3 to 10, the following questions interesting to sanitarians will be discussed :—

Health Department.—1. Is the modern system of Education exerting any deleterious influence upon the health of the country? Papers by Dr. Clifford Allbutt and Mr. J. Hepburn Hume. 2. Is it desirable to take any, and what further, measures to prevent the spread of zymotic diseases through the milk supply of our towns? Papers by Mr. Francis Vacher, F.R.C.S., Dr. Britton, and Mr. Ernest Hart, M.R.C.S. 3. Is it desirable to amend or extend the Habitual Drunkards Act, and, if so, in what direction? Papers by Mr. Norman Kerr and Mr. Samuel Knaggs, M.R.C.S.

Economy and Trade Department.—What should be the functions and powers of local authorities under any scheme of government by County Boards? Paper by Mr. John Newton, Chairman of the York Chamber of Agriculture.

NOTICES OF MEETINGS.

AMERICAN PUBLIC HEALTH ASSOCIATION.

THE American Public Health Association will hold its Eleventh Annual Session at Detroit, Mich., commencing Tuesday, Nov. 13, 1883, and ending Friday, Nov. 16. The subjects which have been chosen for special consideration at that time are. I. *Malaria.* Its etiology and the methods for its prevention in localities or in persons; its American history; its specific particles; its origin; the conditions of its pervasion; its laws of extension, &c. II. *Foods.* Their adulteration; healthy or deleterious modes of preservation and the function of legislation in regard to them. Ascertained facts as to adulterations in this country. Facts as to canned goods, condensed milk, artificial butter and cheese, prepared meats, &c. III. *Vital Statistics.* Methods and results; defects apparent. How far foreign modes of tabulation are to be followed. Systems of collection and classification. Race vitality and the care of population as indicated by statistics. IV. *The Control and Removal of all Decomposable Material from Households.* The mechanical laws, constructions, and appliances relative thereto. The construction of all inside pipes and their connections, their traps and siphonage, flushing, ventilation. How they shall be connected with out-door receptacles, and yet be free from ill effect. The Executive Committee by this outline desires to avoid general dissertations on these subjects, and to secure facts and opinions as to practical methods of dealing with the interest of public health. Reasons for the views entertained, the results of experience and the best judgment as to preventive and restrictive measures are especially sought. Methods and systems of physical education, drill, &c., feasible in the schoolroom, will be discussed. While papers of merit on other topics are by no means excluded, it is believed wise to concentrate the preparation of papers and discussion upon these topics. The Special Committees on Compulsory Vaccination, the Management of Epidemics, and on Diseases of Animals, will, before the completion of their reports, be glad to receive communications from any who have facts or opinions bearing on these subjects. Gentlemen who propose to present papers are respectfully requested to notify the secretary, and to give the titles of their proposed papers. The Executive Committee feels warranted in saying that the meeting promises to be one eminently inviting and profitable, and urges the attendance and co-operation of physicians, engineers, architects, teachers, and all those interested in the advancement of public health and physical well-being. The meeting will be held under the presidency of Dr. Ezra M. Hunt, of Trenton, N.J.

PARKS AND OPEN SPACES.

A WRITER under the *nom de plume* of 'Urbanus,' calls attention to the paucity of seats in Kensington Gardens. He writes to a contemporary, 'Will not some practical friend of poor people and others put a few more seats in Kensington Gardens? They are very much wanted. I went there recently from the High Street, Kensington, end, and saw hundreds of people, many old and infirm, and only two seats in the far distance. Fifty more would be a real godsend.'

APPOINTMENTS UNDER THE PUBLIC HEALTH ACT.

MEDICAL OFFICERS OF HEALTH.

ALLISON, John, L.F.P.S.Glasg., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Bridlington Urban Sanitary District, at £50 for one year.

BROUGHTON, Henry Todd, M.R.C.S.Eng. and L.M., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Heckmondwike Urban Sanitary District, at £20 for one year.

COOPER, Charles Alfred, A.B., M.B., Lic.Med.Trin.Coll.Dub., has been appointed Medical Officer of Health for the Ilkeston Urban Sanitary District, at £30 for one year, *vice* Wood, resigned.

GILES, Bernard Faraday, M.D.Univ.Durh., M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Wem Rural Sanitary District, at £60 for one year, *vice* Flinn, resigned.

GORNALL, Richard Gregory, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Newton Heath Urban Sanitary District, at £50 for one year.

KARKEEK, Paul Quick, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the St. Marychurch and Torquay Urban Sanitary Districts, combined, at £200 per annum for four years.

KENYON, Dr. George Arthur, has been re-appointed Medical Officer of Health for the Chester and Associated Sanitary Districts, at £600 per annum for five years.

LEE, Edward Samuel, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the newly-formed Barking-Town Urban Sanitary District, at £60 per annum.

PERCIVAL, George Henry, M.B.Univ.Lond., M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Northampton Rural Sanitary District, at £40 for one year.

SEPHTON, Richard, L.R.C.P.Edin., M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Warrington Rural Sanitary District, at £60 for one year, *vice* Gornall, whose appointment has expired.

SYKES, William, L.R.C.P.Edin. and L.M., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Mexborough Urban Sanitary District, at £40 for one year.

WILSON, George, M.D.Univ.Edin., Fell.San.Inst.Gt.Brit., has been re-appointed Medical Officer of Health for the Kenilworth, Lillington, Milverton, Rugby, and Warwick Urban, and Meriden, Rugby, Solihull, Southam, and Warwick Rural Sanitary Districts combined, at £800 per annum for three years.

SURVEYORS, CLERKS TO GUARDIANS, INSPECTORS OF NUISANCES, &C.

ADDIS, Mr. Frederick, has been elected a Member of the Hove Board of Improvement Commissioners and Urban Sanitary Authority, *vice* Hawkes, deceased.

BRIDGLAND, Mr. William Ebenezer, has been re-appointed Inspector of Nuisances for the Southend Urban Sanitary District, at £25 for one year.

BUCKHAM, Mr. Frank F., has been appointed Surveyor, Inspector of Nuisances, and Collector to the Corporation and Urban Sanitary Authority of Chipping Wycombe, at £200 per annum, *vice* Drake and Hunt.

BULLOCK, Mr. Joseph, has been re-appointed Inspector of Nuisances for the Shardlow Rural Sanitary District, Derbyshire, at £200 for one year.

CARRICK, Mr. George, Solicitor, has been appointed Clerk to the Wisbech Guardians, Rural Sanitary Authority, Assessment Committee, and School Attendance Committee, and Returning officer (salaries not yet fixed), *vice* Collins, resigned.

CLAYTON, Mr. William, has been appointed Inspector of Nuisances for the Southowram Urban Sanitary District, at £10 per annum, *vice* Nixon, resigned.

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CUNLIFFE, Major, has been appointed Chairman of the Board of Lytham Improvement Commissioners and Urban Sanitary Authority, *vice* Hull, resigned.

DAGLISH, Mr. George, has been appointed Collector to the Ryton Local Board and Urban Sanitary Authority, co. Durham, at £40 per annum, *vice* Benson, resigned.

DERRY, Mr. John, has been appointed Clerk to the Lichfield Guardians and Rural Sanitary Authority to the Assessment Committee, and to the School Attendance Committee, and Returning Officer, at £200 per annum for the whole.

FISHER, Mr. W., has been elected a Member of the Board of Bournemouth Improvement Commissioners and Urban Sanitary Authority, *vice* Walker, resigned.

GEACH, Mr. Arthur, has been elected a Member of the Falmouth Parish Local Board and Urban Sanitary Authority, *vice* Williams deceased.

GRATION, Mr. James Henry, Branch Manager of the Wakefield and Barnsley Bank, has been appointed Treasurer to the Corporation and Urban Sanitary Authority of Barnsley, *vice* Watson, deceased.

HARTLEY, Captain, has been elected Chairman of the Board of Bournemouth Improvement Commissioners and Urban Sanitary Authority, *vice* the Rev. J. R. Pretyman, resigned.

HELLYER, Mr. Edward Thomas Trew, Manager, Capital and Counties Bank, Romsey, has been appointed Treasurer to the Corporation and Urban Sanitary Authority of Romsey, *vice* Johnston, resigned.

HILL, Alfred Bostock, M.D., L.R.C.P.Edin., L.S.A.Lond., S.Sc. Cert.Cantab., has been appointed Public Analyst for the City of Coventry, at 21*s.* per analysis, and £3 3*s.* per day and travelling expenses when required to give evidence, *vice* Swete, resigned.

JESSOP, Mr. W., has been elected a Member of the Ripley Local Board and Urban Sanitary Authority, Derbyshire.

MARTIN, Mr. Manoah, has been re-appointed Inspector of Nuisances for the Hailsham Rural Sanitary District, Sussex, at £110 for one year, ending Michaelmas 1884.

MAWBEY, Mr. E. G., has been appointed Surveyor to the Corporation and Urban Sanitary Authority of Kings Lynn, at £300 per annum, *vice* Hall, retired.

PARKER, Mr. Charles John Bullivant, Banker, has been appointed Treasurer to the Corporation and Urban Sanitary Authority of Grantham, *vice* Hardy, deceased.

REED, Mr. Benjamin B., has been elected a Member of the Tunbridge Wells Local Board and Urban Sanitary Authority, *vice* Weare, resigned.

RIDDIOUGH, Mr. Michael, has been elected a Member of the Oakworth Local Board and Urban Sanitary Authority, Yorkshire, *vice* Wright, deceased.

STEBBINGS, Mr. William, has been elected Chairman of the Eas, Dereham Local Board and Urban Sanitary Authority, *vice* Elvin resigned.

WILLIAMS, Mr. Edward, has been elected a Member of the Mold Local Board and Urban Sanitary Authority, *vice* Roberts, resigned.

WILLIAMS, Mr. Evan, has been appointed Inspector of Nuisances for the Bridgend Urban Sanitary District, Glamorganshire, *vice* Morgan.

WOOLLASTON, Captain, has been elected a Member of the Board of Bournemouth Improvement Commissioners and Urban Sanitary Authority, *vice* Pretyman, resigned.

LOCAL INTELLIGENCE.

BILSTON IMPROVEMENT COMMISSIONERS AND URBAN SANITARY AUTHORITY.—Messrs. Joseph Skemp, James Thompson, Thomas Johnson, Edward Hill, and Richard Thomas, the five retiring members, have been elected for the ensuing three years.

BROMSGROVE LOCAL BOARD AND TOWN COMMISSIONERS AND URBAN SANITARY AUTHORITY.—Messrs. William Smith Batten, William Ward, John Broad Wilson, William Thomas Baylis, and Dan Roper, have been elected members for the ensuing three years.

BROWNHILLS LOCAL BOARD AND URBAN SANITARY AUTHORITY.—The Local Governme nt Board have confirmed the order for the division of the district into four wards, and for the increase of the number of members from nine to twelve.

LONGRIDGE LOCAL BOARD AND URBAN SANITARY AUTHORITY.—The first election of members has resulted in the return of Messrs. Robert Smith, Henry Wareing, James Kay, Edward Dewhurst, Richard Livesey, James Tullis, Robert Howarth, and James Pye Whittle, and Dr. Boardman. Mr. Robert Smith has been elected Chairman.

The Okehampton Guardians and Rural Sanitary Authority recently decided to pay the Medical Officer of Health by fees instead of salary: but as the Local Government Board object, the resolution is to be rescinded, and an advertisement issued, inviting applications, stating salary required, but not to exceed £50 per annum.

STOURBRIDGE IMPROVEMENT COMMISSIONERS AND URBAN SANITARY AUTHORITY.—Messrs. John Ick, Edwin Stringer, and William Platt, have been elected members for the East Ward, Henry Turney, Mark Palfrey, and Joseph Worton Woolley, for the West Ward, and J. Gillam, J. Parkes, and A. Walker, for the South Ward.

The Wednesbury Local Board and Urban Sanitary Authority have, upon the recommendation of the Sanitary Committee, increased the salary of Dr. John C. Garman, the medical officer of health, from £84 to £168 per annum, for the nine months ending June 24, 1884, in consideration of his extra services during the late epidemic of small-pox.

The Thetford Town Council and Urban Sanitary Authority, at their last quarterly meeting, passed the following resolution:—"The Council, in accepting the resignation of Mr. Houchen, who for a period of thirteen years has served the office of Town Clerk with zeal and judgment, desires to record their appreciation of the services rendered by him both to the council and the town at large." Mr. Houchen (who appeared to be taken completely by surprise) briefly returned thanks.

The Workington Local Board and Urban Sanitary Authority have received a communication from the Local Government Board, reminding them that the appointment of Dr. Alexander Hogg as medical officer of health, was sanctioned for one year only, and urging now, upon its expiration, a combined appointment as formerly.

There were 152 applicants for the office of surveyor to the Corporation and Urban Sanitary Authority of Kings Lynn, at £300 per annum.

Mr. John Allsopp, the surveyor to the Worksop Local Board and Urban Sanitary Authority, has declined to accept the increased salary of £200 per annum, in consequence of the restriction against private practice, as mentioned on p. 95, and given notice to terminate his engagement at the expiration of three months, or of the financial year.

Mr. W. H. Nankivell, who was recently re-appointed surveyor to the East Dereham Local Board and Urban Sanitary Authority at £25 for one year instead of £50 as before, has declined it, on account of the inadequacy of the salary.

Mr. Edmund Oldfield, the late Chairman of the Swaffham Board of Guardians and Rural Sanitary Authority, has been presented with a massive silver tea and coffee service, engraved with his arms and crest. The teapot bears the following inscription:—'This service is presented to Edmund Oldfield, Esq., Foulden Hall, by the Guardians and Officers of the Swaffham Union, Norfolk, and other friends (43 subscribers), in recognition of his valuable services as Chairman of the Union during a period of twenty-three years. A.D. 1883.'

The Amersham Rural Sanitary Authority recently appointed Mr. William Hosegood as medical officer of health at £50 per annum, being one half of that paid to Mr. Brickwell, whom he succeeded. The Local Government Board, upon being applied to to confirm the appointment, have asked the reasons for this large reduction, and intimated that they do not view proposals of this nature with favour, as the natural tendency of the reduction of salaries is to discourage officers in the discharge of their duties.

There were 105 applicants for the office of Surveyor to the Dawlish Local Board and Urban Sanitary Authority, at salaries ranging from £49 10*s.* to £400 per annum.

LOWESTOFT IMPROVEMENT COMMISSIONERS AND URBAN SANITARY AUTHORITY.—The following have been elected Members for the ensuing three years:—East Ward, Messrs. Tracy, Ling, and T. Hobson; West Ward, Messrs. Maconochie, Ward, and H. Jeffries; South Ward, Messrs. Howett, Warman, and J. Hobson. Mr. H. Jeffries was elected Chairman, *vice* Clarke, who did not offer himself for re-election.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

The following prospectus of the officers and constitution of this Association has been forwarded to us for publication:—

Chairman—George B. Jerram, A.M.I.C.E., M. & S.E., surveyor and inspector of nuisances, Walthamstow; Vice-Chairmen—William Rains, sanitary inspector, vestry of St. George-in-the-East; Thomas Rees, inspector of nuisances, Guildford Rural Sanitary Authority; Thomas Buckworth, sanitary inspector, St. Saviour's District Board of Works. Treasurer—Arthur H. Lukes, sanitary inspector of Gravesend. Council—E. Reeve Boulter, surveyor and inspector of nuisances, Bexley Local Board; William Henry Bond, sanitary inspector, St. Giles District Board of Works; W. H. Lewis, sanitary inspector, Port of London Sanitary Authority; Thomas Matthews, inspector of nuisances, Croydon Rural Sanitary Authority; G. S. Sherborne, sanitary inspector, Vestry of Chelsea; F. T. Poulson, inspector of nuisances, Tottenham Local Board; Valentine Harris, inspector of nuisances, Borough of Wolverhampton; Samuel P. Fisher, inspector of nuisances, Vestry of Camberwell; Robert Chamberlain, inspector of nuisances, Vestry of Hammersmith; Edwin Brooks, sanitary inspector, Vestry of St. James, Westminster; Thomas Stace, sanitary inspector, Limehouse District Board of Works; C. W. Raymond, inspector of factories, Poplar District Board of Works; Samuel C. Legg, C.S.I., inspector of nuisances, Hackney District Board of Works, hon. secretary, 62 Gayhurst Road, Dalston, London E., from whom any further information concerning the Association may be obtained.

RULES.

I.—NAME.—That the Society be called "The Association f Public Sanitary Inspectors."

II.—OBJECTS.—That the objects of the Association be—(*a*) The promotion and interchange among its members of that species of knowledge and practice which fall within the department of an inspector engaged in carrying out the duties imposed upon him by the Public Health, Local Government, and other Sanitary Acts. (*b*) The general promotion of the objects of sanitary science in connection therewith.

III.—CONSTITUTION.—That the Association shall consist of three grades, viz.:—(*a*) Members, who shall be inspectors holding or having held appointments as per Rule II., who alone shall elect the executive. (*b*) Such honorary members as shall be elected by the Council, from among whom the President may be elected. (*c*) Asso-

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ciates, who shall be persons interested in the objects of this Association, and approved by its members.

IV.—Executive of Association.—That the affairs of the Association be governed by a Council, consisting of a Chairman, three Vice-Chairmen, Treasurer, Secretary, and twelve members, to be elected annually from among the members, five to form a quorum.

V.—Election of Council.—The election of the Council shall be as follows:—Any member may nominate another for the Council, and such nominations shall be delivered to the Secretary at least one month before the annual meeting, and such nominations shall be printed and a copy sent to each member of the Association not lees than fourteen days previous to the annual meeting. Every member shall be entitled to vote for the required or any less number of such nominations and return the ballot paper within seven days from the date of issue, which shall be examined by the Chairman, Secretary, and two scrutineers, appointed at the previous annual meeting, or by any two members not being nominated who shall be appointed by the Council.

VI.—Mode of Election.—Every person wishing to join the Association and eligible as a member, shall be proposed and seconded by two members, and if as an Associate shall fill in a prescribed form and be proposed by at least five members, such proposal form to be read at a meeting one month before that of election, and the election shall be made at such meeting if the proposal is approved of first by the Council. All elections to be by ballot, one black ball in five to exclude.

VII.—Subscriptions.—That the entrance fee for members and Associates be *2s. 6d.*, and the annual subscription be 10*s.* payable half-yearly in advance, and if any member should allow his subscription to fall twelve months in arrear the secretary shall write to inform him of the same; and if he does not pay it within three months from the date of such communication, the Council shall have the power to call upon him to resign; but in no case shall he be allowed to vote unless he shall have paid his subscription in full for the past year.

VIII.—Meetings.—The ordinary meetings of the Association shall be held on the first Saturday of each month from October to May, inclusive. Special meetings may be convened by the Chairman and Secretary jointly, or by a requisition signed by any five members of the Association, and the Secretary, on receipt of such requisition specifying the business to be brought forward, shall forthwith issue the necessary circulars convening such meeting. The circulars convening *any* meeting shall specify the business to be brought fotward. All meetings shall be convened by circular.

IX.—Expulsion of Members.—In the event of any complaint being laid before the Council concerning the misconduct of any member, or whenever there shall appear sufficient cause for the removal of a member from the Association, the Council shall have power to investigate the same and to remove his name from the list of members, and thereupon he shall cease to be a member.

X.—Making or Altering Rules.—No new rule shall be made, or any of the rules herein contained or hereafter to be made, shall be annulled, altered, or rescinded, unless by a vote of a majority of the members present at a general meeting of the Association, specially called for that purpose, notice whereof shall be given as per Rule VIII.

NOTES AND QUERIES.

Having for some time back been in the receipt of Queries appertaining strictly to sanitary work, and which it would be easy to answer without having to refer our correspondent to competent professional advisers, we have opened a column in which to register such Queries and Replies thereto as can fairly be expected from us; and our subscribers and readers are invited to make such use of this column as will tend to benefit themselves and the community. Both Queries and Replies will, however, be subjected, if unnecessarily long, to a strict curtailment.

102. Fat Melting.

What are the best practical means for abating a nuisance or preventing or counteracting the effluvia from a candle house and melting house? H. S. F.

[1. Offensive kinds of fat that can be covered up, such as kitchen stuff, should be covered, or stored in a chamber or closet communicating with the external air only through the medium of a screen containing wood-charcoal. 2. Of the methods of rendering in common use, that by the use of steam, either free or applied by means of a jacketted pan, is by far the least offensive, and in towns is the only method which, as a rule, should be permitted. Rendering by fire-heat should be adopted only in localities where it can be no nuisance to neighbours, and should be confined to the rendering of nothing but the freshest butcher's fat. 3. The nuisance arising during the removal of the tallow from the melting pan when fire-heat is employed, can be lessened by raking out the fire or reducing it to a minimum during the process, and by the erection of a large hood over the pan and receiving vat, which shall conduct the vapours given off into a tall chimney. 4. When 'greaves' are pressed, the nuisance may be abated by closely boxing up the press and the receiving vessel, and by conducting the vapours by a pipe into a fire or tall chimney shaft. 5. The general offensive and rancid smell from melting-houses may be minimised by greater cleanliness and the periodical scraping and cleansing of the floors. For much valuable and detailed information on this subject, consult pages 197 *et seq.* of Dr. Ballard's 'Report on Effluvium Nuisances,' in the Blue-book of the Medical Officer of the Local Government Board for 1876.]

103. Overcrowding.

To meet the requirements of the Public Health Act, 1875, what should be the minimum cubic square per head in (1) Barracks, (2) workhouses, (3) private dwelling-houses, (4) registered common lodging-houses. H. S. F.

[There is not, either in the Public Health Act or the official orders made under it, any precise standard of cubic space which can be universally applied in cases of presumed overcrowding. No one standard can be framed which shall be equally applicable in every case, inasmuch as the quantity of space needful for the healthful occupation of a house or room must vary according to many circumstances. The standard would have specially to be varied according as the rooms are occupied, by day only, or by night only, or by day and night, and also according to the means of ventilation provided for each room. With this preliminary caution, the following figures may be given:—(1) Barracks, 600 cubic feet (Army Regulations); (2) Workhouses—healthy adults, 15 to 20 square feet of floor space (Local Government Board Regulations); (3) Private Dwelling Houses, 1,000 cubic feet (Parkes), but in practice much less than this has to be tolerated. London police magistrates have held that there was overcrowding if the space available for each inmate of each room fell short of 400 cubic feet. (4) Common Lodging-houses—250 to 300 cubic feet, according to height of room. See Sanitary Record, vol. x., p. 285.]

104. Ventilation.

Some years ago, upon the conclusion of the celebrated experiments at Kew, the committee of the Sanitary Institute of Great Britain upon experiments on cowls and other automatic modes of ventilation appealed for subscriptions for the further investigation of the subject. What has been the result? has it been published? and where can it be obtained? As ventilation by means of exhaust cowls is in a very unsettled state, any information will be of value. Ventilation.

[The experiments which were made at Kew, and at many other places, by the Commissioners of the Sanitary Institute of Great Britain, have lasted over several years, and have taken up an extraordinary amount of time and patience, necessitating even the erection of a special building by them in Kew Gardens. Everyone has afforded them every facility to assist to carry out their labours. The most peculiar results may, we understand, be looked for. Each subscriber of One Guinea to the fund, payable to Mr. E. White Wallis, at the offices of the Institute, 9 Conduit Street, W., is entitled to a copy of the report. This report is now in course of preparation. The Commissioners were Capt. Douglas Galton, F.R.S., Mr. Rogers Field, B.A., C.E., and Mr. W. Eassie, C.E.]

105. Compulsory Removal to Hospital.

Clerk to U.S.A. sends the following extract from a recent letter of the Local Government Board as expressing their views on the proper interpretation of the words 'proper lodging and accommodation' in Section 124 of the Public Health Act, referred to by 'X' in last month's Record. 'The Board believe that in some cases magistrates have granted orders of removal on grounds which had reference, not so much to the welfare of the patient as to the fact that the patient was so placed as to be a probable source of infection to others. It appears to the Board, however, to be open to doubt whether the words in question do include cases where the accommodation being sufficient as regards the interests of the patient, is only open to objection on account of the probable spread of disease. On the other hand, if in any particular case the magistrate decide in accordance with the view that the welfare of the patient alone is to be considered, not only the capacity and means of ventilation of the room occupied by him should be taken into account, but also whether the use of the room as a living room or sleeping room would not of itself be injurious to health.'

106. Keeping Cattle in Slaughter-houses.

The by-laws of the Whitby District Local Board with respect to slaughter-houses, say: 'An occupier of a slaughter-house shall not at any time keep any cattle or cause or suffer any cattle to be kept in such slaughter-house for a longer period than may be necessary for the purpose of preparing such cattle whether by fasting or otherwise for the process of slaughtering.' I take it that under such a clause as this there is no limit to the time for which an animal or animals intended for slaughtering may be kept. Will you kindly inform me if I am right. W. B. H.

[The by-law in question must be practica ly useless, as in order to obtain a conviction under it the prosecution would have to prove that the animal in question was kept in the slaughter-house for an unnecessary time. Still in case of a *very long* detention justices might fairly infer that it was unnecessary, and convict under the by-law, unless a satisfactory explanation of such detention were given by the defendant.]

107. Hygiene.

Will you kindly inform me in your next issue what is the most practical and at the same time interesting work on hygiene? M.D.

[Parkes's 'Practical Hygiene' (J. and A. Churchill) is the standard work on the subject. Dr. George Wilson's 'Handbook of Hygiene,' also published by Churchill, New Burlington Street, is a smaller work, and would probably serve your purpose.]—Ed.

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THE SIXTH CONGRESS
OF THE
SANITARY INSTITUTE
OF GREAT BRITAIN,
Held at Glasgow, from Sept. 25 to Sept. 29, 1883.

HEALTH.*

BY PROFESSOR G. M. HUMPHRY, M.D., F.R.S.,
PRESIDENT OF THE CONGRESS.

So close is the interdependence of the physical, the mental, and the moral in man that an improvement or a deterioration in any one of them is certain to be attended by an improvement or a deterioration in the other two. If, from indifferent sanitary arrangements or other cause, the physical be allowed to sink, the mental and moral forces must soon be weakened. So, also, good sound education and that mental training which gives strength to thought and judgment, and which can only be carried out in the healthful body, will react beneficially upon the body as well as upon the moral tone, and will add to that uprightness and honour and that vigorous bearing which make the man. Still more true is it that moral delinquency ravages both body and mind, throws its dark shadow over coming generations, and infallibly leads to the degradation of the species. It does this mainly by its direct and indirect influence upon the body, by the infecting stain there which—like that upon the character—lurks and leavens the whole, and bears on the father's sin to distant generations.

Now what is so important, and what we want our legislators to feel, especially at the present particular juncture, is this—that in proportion as this stain is allowed to exist and to propagate itself, and by its hydra-headed maladies to damage the bodies and lower the physical status of the people, so much the greater will be the deterioration of character and the tendency to moral obliquities of various kinds. This is one, and a potent one, among the ways in which vice sows the seed of future noxious weeds and fertilises the soil for their growth. The moral delinquencies damage the body, and so the damaged body is the more prone to the moral delinquencies. The action and reaction is direct and swift. One way, therefore, to limit and arrest moral disease and to increase the healthy moral tone of a community is to limit and arrest bodily disease and to labour in every possible manner to improve the sanitary condition of the body. No sentimental fancies, no overdrawn apprehensions of interference with the liberties and rights and free action of citizens should be allowed to hinder the enforcement of those principles and laws which are requisite for the prevention and mitigation of disease, whether they be in the form of Factory Acts, of Educational Codes, of Contagious Diseases Acts, or of provisions for the careful and humane conduct of experimentation upon animals. Let the *salus populi*, simply and sensibly and at the same time scientifically considered, be really and practically the *suprema lex*. Thus shall we best promote strength of mind, with attendant wise judgment and discretion, as well as sound morality, with attendant high-mindedness and honourable feeling, in our people.

How largely does experience show us that the body is not merely the inlet to the mental and the moral chambers and the agent of the forces emanating thence, but that it is also, and to some extent consequentially, the type of them? How much, that is to say, of them can be inferred from it? What do we not learn of the largeness and strength and vigour of them from the corresponding evidences in it? How rarely is a strong and vigorous mind associated with a feeble and inert body? What kind of character do we judge to be the accompaniment of the upright frame, the open face, and the straightforward step?

By this providential, or natural, law of the association of the physical with the other qualities is worked out the predominance of the best. In the great struggles of nations the best win, because goodness is the associate of strength and healthfulness; and the maintenance of the sanitary condition of a people is a necessity to the maintenance of a high position among others. This becomes yearly more and more the case as increasing civilisation makes us increasingly dependent upon sanitary regulations and determines more clearly what those regulations should be. It is thus that civilisation meets and counteracts her own evils. The clustering of peoples in masses together promotes, in various ways, the liability to disease, while growing intelligence and advancing science point out the means of preventing and arresting it; and as prevention is better than cure, so the science which promotes the former is better than that which attempts the latter. To this the members of my profession are fully alive and willingly assent; and though their pecuniary gains are won by their efforts to cure disease, it is their constant and unselfish aim to trace out and stamp out the sources of disease; and it is their desire and practice to take an active part in every movement which has for its object the improvement of the sanitary condition of our people. Well will it be for our country when increased opportunity is given to them, in Parliament and out of Parliament, of making a deeper impression on the convictions of the country.

A STATE SANITARY DEPARTMENT.

One result, that we might anticipate from such an influence, would ere long be the institution of a Sanitary Department in our legislature, distinct from the Local Government Board, and under the direction of a Minister of Sanitary Affairs; and I can scarcely conceive anything more likely than this to promote the well-being of our people and their success in everything they undertake, whether it be literary, scientific, commercial, or military. Such an office, extending its administration to the sanitary condition of cattle, would do much to reinstate the interests of agriculture, and to reduce the price and improve the quality of animal food; and it would find a further scope for action in considering and checking the diseases to which our various food-producing plants become more liable as they are more highly cultivated; and which, in many parts of the globe, are producing great devastation and pecuniary loss, with accompanying distress and injury to the peoples. Under such a sanitary office the department of the Registrar-General would properly be placed; the Ordnance and Geological Surveys and the Meteorological Office should be in connection with it; and this institute would be a valuable handmaid in carrying on that which is perhaps its most important

* Abstract of Inaugural Address delivered at the Sixth Congress of the Sanitary Institute of Great Britain, Glasgow, September 1883, in the section of Sanitary Science and Preventive Medicine.

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work, the conducting the examination of surveyors and inspectors. The greater extension of this work is sorely needed. A certain amount of suitable education, tested by examination, should be required of all candidates for these responsible offices; and it is obvious that a satisfactory fulfilment of the duties of surveyors and inspectors, and a respect for their opinions cannot be expected unless there is some security for the possession by them of a knowledge of the elements of sanitary science. The University of Cambridge has undertaken, and for some years carried on, an examination of medical men for certificates in sanitary science. Such certificates should be a necessary qualification for medical officers of health; and a subject of so great scientific interest, demanding so wide a range of knowledge, and fraught with such far-reaching benefits to mankind, ought certainly to be included in the area of University teaching. The funds at the disposal of the University of Cambridge are not at present sufficient to accomplish this, or likely to be so for some time; and I do not know that a wiser and more beneficent direction could be given to the liberal aspirations of those who are indebted for ample means to the bone and sinew of the people than the foundation of a Professorship of Sanitary Science in the University, so giving the subject a definite place in the studies at thatancient seat of learning.

Among other benefits which would be likely to follow the formation of a separate governmental department, giving its full and undivided attention to sanitary matters, is the redistribution and greater equalisation of the sanitary districts, together with a provision for their harmonious co-operation—the bringing, that is, of all into closer relation with one another and with the central department, so that the events which are taking place in one district might be speedily communicated, telegraphed if necessary, to others, and timely preventive measures against the spread, or transmission, of disease be taken.

Moreover, the higher and more definite relation with the Government of a separate sanitary department would tend to promote that official sympathy which is now much wanting, and would encourage a proper attention to and recognition of the services of those men who devote their time and abilities to sanitary science. It would also lead to a due consideration by Parliament of the pressing sanitary needs of the people.

Good sanitary legislation must ere long be recognised as one of the first necessities for a prosperous people; and the Government of England ought not to lag behind, as it has a tendency to do, in its efforts to provide this great boon for the nation. It should take more active cognisance of the fact that a people must be preserved from the effects of their own imprudence; and it should not leave the carrying out of hygienic works, so much as it does, to parochial administrations and local authorities.

The Government of the United States has shown its consciousness of responsibility to take action in this direction by a resolution of Congress, introduced at the suggestion of the National Board of Health, requesting the President to call an International Sanitary Conference, with a view to consider and improve the condition of the ports under the jurisdiction of the several Powers, as well as of the vessels departing from them. That Congress was well attended by delegates from Europe and other parts; several questions were seriously and carefully discussed, and important propositions were made. What is perhaps even more to the point, each State, with few exceptions, has its 'State Entomologist'; and they all publish full annual reports upon the damage done to food-plants by various insects, and suggest means of prevention. Why should not something of that sort be done here? In most of the European States there is some recognition of duty in this respect; and much has been done in England through the Board of Health, the Local Government Board, and various legislative enactments. Still there is ample room for England to concentrate and improve her national sanitary organisation in such a manner that it may be an example to others.

Naval and Military Sanitation.

Above all, in the case of the army, and also of the navy, it is a most urgent need that the sanitary service should be rendered more efficient, and placed upon a definite footing as a separate part of the medical staff, so that it has its distinct training, duties, and responsibilities. This cannot be too strongly impressed upon the authorities at the War Office and the Admiralty. Next in importance to good generalship, for the success of a campaign, is good sanitary arrangement. Of what use are the best soldiers unless they are well handled and kept in good health? The prevalence of disease brings not only fatality but dispiriting and disorganisation. The massing together of troops in any place is certain, after a short time, to be productive of disease, unless the precautions taken against it are most careful and most rigid: and sad experience tells that the ranks of a stationary army are liable to be quickly decimated. To this are to be added the contingencies of climate, exposure, sudden variations in marches and in food, and the many liabilities of a soldier's life, to say nothing of the inflictions of a soldier's dress and accoutrements. The records indicating an amount of unhealthiness in the British armies, exceeding that of the French and some others, ought to stimulate to some change in our arrangements. It has been computed that in ordinary warfare the victims of disease are three times as many as those of the sword, with which, I take it, are included the fearful adjuncts to that weapon made by modern science. This startling announcement ought surely to arouse the attention and stimulate the efforts of authorities. Yet it appears that little advance has been made since the disastrous period of the Crimea. It is appalling to contemplate what would probably have been the consequences of a prolonged campaign in Egypt. The insufficiency of the provisions for the medical staff in Egypt, of which we heard so much—I do not mean of the medical staff itself, but of the provisions for its operations—are bad enough; but the want of a thorough sanitary organisation, under the direction of well-instructed and able men, is a far graver source of danger. Upon the lowest ground, as a mere matter of economy, this subject demands serious and urgent attention. The brave British soldier or sailor is a costly as well as a valuable article, and ought not to be at the risk of exposures to sources of disease, which science and wisdom would have foreseen and provided against.

Under the most favourable circumstances, and in spite of the good influence of drill and discipline upon the physical and mental qualities of the men, a standing army is, to some extent, necessarily a

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deteriorator of national physique, inasmuch as by the selecting influence of recruiting regulations the best specimens are withdrawn from the community just when they are entering upon the vigorous period of manhood; and they are subjected to a high rate of mortality, especially from lung disease, which is attributed to what has been termed 'vitiated barrack atmosphere,' as well from exposures of other kinds to which I have alluded. The augmentation of an army, therefore, directly debilitates a nation and lessens its fighting power by the drain it makes upon the best bone and blood of the land. This is fully as serious as the drain which it makes upon gold, even if we take into account the diminution of gold-producing power consequent on the abstraction from the labour market of so many men in the prime of life; and it is less easily repaired. Every effort, therefore, should be made to reduce the drain to the minimum by the adoption of those precautions which sanitary science and experience show to be most calculated to prolong life and give health to the soldier.

The Treatment of Infants.

Small matters have often great import, especially at the beginning of life; and this may be truly said of those mischievous two yards of calico, which wound round the middle of so many infants on their introduction into the world, as a sort of baptism to the numerous evils of fashion in dress to which they are admitted, constrict and hinder the expansion of that very region of the body where heart and lungs, stomach and liver, organs of no mean importance, are struggling for room to grow and do their work, and where natural mechanical conditions throw some difficulty in the way of full development. The expansion of the lower part of the chest, which is so pronounced a feature in the well-formed human figure, is attained chiefly in the higher animals, and, like most of such higher prerogatives, is the result of more than ordinary effort, and is, proportionately, liable to suffer from interference. The chief effort to accomplish it is made, soon after birth, when breathing and food-taking, and the various changes incidental upon them begin; and at this very juncture the opportunity is taken by meddlesome hands to hinder the expansion of the region where these new processes, upon which the well-being of the whole fabric depends, have to be initiated and carried out. A more pernicious device can scarcely be conceived than this relic of antiquated nursedom; and it is impossible to estimate the number of deformed, or pigeon-chests, of hampered stomachs, livers, lungs, and hearts, with their varied attendant life-enduring infirmities, and curtailment of life, that must result from the use of these 'swathers,' as they are called, for which there is not the slightest necessity. The oft-condemned tight waist-banding, and lacing of after years, which affects only the small fashionable section of one-half of the community, is not, even in those who are subjected to it, so mischievous as this concealed semi-strangling process which is diligently carried out in the case of a large proportion of infants of all classes. Of the three demands of the infantile period—liberty of movement, fresh air, and good food—it seems strange that the first two should be limited by smothering bed-clothes, swathers, long petticoats, and other dress-devices, together with imperfect ventilation of rooms, while the last is liable to be supplied sometimes in insufficient quantity and bad quality, but often, whether good or bad, in superabundance. How many poor helpless children are condemned into spasms, diarrhœa, convulsions, and death, which are complacently attributed to teething, that never failing cover for the multitude of the sins of the bottle. No other infant has, altogether, so bad a time of it as the human. None pays such penalties to the caprices, the fancies, the theories, and, above all, the immoralities of its parents.

A host of maladies with a corresponding death-rate are ignorantly regarded as its rightful heritage; and as a sort of excuse for this many-headed monster in the form of maltreatment, it is urged that, after all, the effect is that the weak are weeded out while the stronger survive, so as to result in the production of a healthier average manhood, and the maintenance of a finer stock. It is said that if, by better sanitary arrangements, we keep alive the weaker members, the effect will be that the physical status of the whole family will be lowered. A little consideration will, however, show that this is not only an inhuman but also a partial view; and we shall find here no exception to the rule that that which is most right is most politic. The same better methods which preserve some in life who would otherwise have passed out of it give better condition to all those who survive. All are, as it were, raised a step on the physical ladder, and the status of the whole is improved.

The Foot and its Covering.

The mention of one part of the human frame which labours under developmental difficulties, and which is sorely hindered by impediments, reminds of another part which is even worse circumstanced. The well-formed human foot may be regarded as nature's last and hardest, and not least beautiful, work. It is the most characteristic feature of the human body, that to which man owes his erectness and firmness of gait and his ability to use the hand as the minister of his will. Even under favourable circumstances it attains perfection only in the higher groups of the human family; and in them fails to do so more often than any other part of the body. The compact well-formed arch, the slightly spreading and gracefully curving supple toes, which give firmness together with spring and elasticity to the step, are comparatively rarely attained; and what atrocious impediments are thrown in the way of their acquiring and maintaining their proper form! The foot confers, as I have said, much upon the hand, and ill deserves the return made to it. How pretty is the infant foot, graceful in outline, supple, free, and varied in its movements. It has the hard task before it of being the unaided weight-bearer and propeller of the body reared erect and at right angles upon it; a task which it alone in the animal world attempts, and for which an exquisite mechanism is required and provided. Accordingly, it is forthwith hindered in its proper growth, crippled, deformed, stunted and weakened by bad-fitting unyielding cases constructed with an ill-advised view to economy or in accordance with a bad and meretricious taste. Never has this been more exemplified than in the odious combination of high heel and compressed pointed toe which transforms beauty to ugliness, curtails the play of the foot, shortens the step and spoils the gait. We regard the Chinese foot as the *ne plus ultra* of barbarism in fashion, and we think of it with wonder and horror.

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But, be it remembered, that foot is not intended to do work. It is unfitted for duty and it is relieved from it. The Chinese lady is not to be subjected, like common folk, to the undignified trouble of walking about; and her feet are therefore superfluous. The Chinese must regard our fashion as even more absurd which cramps the feet and yet expects them to do their work, which takes away the straw and yet requires the tale of bricks. Still fashion will have its sway, and will bring its penalties in flat feet, crooked toes, and corns; and these, besides the direct suffering and trouble they induce, by interfering with natural exercise and movement, weaken the whole body, and lead to a variety of secondary ailments. Indeed, swathers and tight shoes may well be regarded as among the insidious and fertile sources of disease.

Peculiarly is it the case in this island with regard to the foot. For if I mistake not, our countrymen, well cared for by nature in this respect, are, with regard to it, the greatest offenders against nature; and these offences in the matter of the foot are among the most prejudicial of their kind. The tattooings and nose and lip borings of various Indian tribes, and the head-flattening of others, which we stigmatise as barbarous, are not so damaging as the foot-spoiling so common among ourselves, and especially among our agricultural poor. The straight firm great toe, the high planted arch, the well developed calf—three specialities of man, without which he cannot walk and run as he ought to do, are too commonly made, during childhood, to degenerate into the obliquely slanting toe, the flat foot and the puny calf. The hobbling hesitating gait is substituted for the firm bold step. We must proportionately suffer in the race of life, and shall infallibly find out the disadvantage to our cost, whenever we come to be matched in the military march against a better shod and better footed people.

Education.

To pass on to another subject which greatly concerns the well-being of the young, and therefore of the whole community, and which does so more especially at the present time, when it is being extended to the masses of our population, viz., Education. Will this extension advance the sanitary and moral condition of the people, and therefore prove a boon to them, or will it not? This is a serious question; and the answer depends upon the quality and quantity of the education given. Education which strengthens as well as informs the mind, which increases the powers of reasoning as well as provides the material upon which to reason, will, we may be certain, improve the physical as well as give tone to the moral qualities of man. All experience proves this. Knowledge, conjoined with the power to wield it, brings all nature under our sway. It not only reveals to us the best paths to health and strength of mind and body, but it also enables us to follow them. Sanitarians are therefore necessarily educationists; and their work is to ascertain and point out the kind of education which will be thus improving, to show that all which passes under the name of education does not deserve the name, that much, indeed, which is so called is calculated to produce the very opposite effects to those which are intended, being likely to lower instead of elevate the mental and moral standard. This it assuredly will do if it is conducted or so pressed, as in any degree to weaken or damage the physical status.

It is for us to point out and strongly impress upon those who are engaged in education, that that education, and that only, is good which stores the mind without injuring the body. We cannot too often, or too forcibly, reiterate the statement that the mental and moral qualities are largely dependent upon the physical, and will rise or fall with it, and especially in these days, when, in the growing struggle for existence, teachers are being ranged against teachers, and pupils against pupils, in competition for certificates, prizes, and places. The temptation to overstrain, and be overstrained, is great; and the ill results upon mind and body are becoming more and more apparent. Every mental effort is attended by brain-wear. The greater and more prolonged the effort the greater the wear; and, unless sufficient time be allowed for repair, exhaustion ensues, and the brain is rendered less capable of renewed effort. Let it be remembered, especially, that this is true of attention. The teacher is apt to think attention is an easy matter, and to punish quickly for inattention, whereas in reality it is almost the whole matter. It is the concentration of the mental batteries under the influence of the will. To effect it well requires a considerable effort of the will, which can be maintained, in children especially, only for a short time—for a few minutes in little children; and the attempt to enforce it longer, if unfortunately successful, leads to exhaustion of the power to make the effort, in short, creates inattention, and the frequent repetition of the process renders the inattention habitual. The more intense the effort at inattention the more true is this. Yet the cultivation of the habit of quick fixed attention, which implies the restraint of wandering thought, constitutes the most essential feature of good education. Upon it briskness of apprehension, memory and mental power, in great measure, depend. Good bodily vigour is necessary for it. When weak, languid, or tired, we cannot apply our minds effectively, that is, we cannot closely attend to anything; and we have greatest difficulty in doing so with regard to the subjects which interest us least.

Much has been written, by Chadwick and others, on the evil done by the length of time during which children are kept in schools and expected to bend their minds to subjects which, uninteresting in their nature, are rendered still more so by the manner in which they are taught; and of the truth of the allegation there can be little doubt. It is, on the face of it, absurd, or worse than absurd, that children should be pent up in ill-ventilated rooms for the space of two and a half or three hours at a stretch over dull lessons. Such treatment necessarily prevents the acquisition of the habit of attention, induces idleness, carelessness, apathy, and dulness, enervates both body and mind, and brings large numbers to the condition of having learned one thing only thoroughly, and that is to hate learning. Better results may be expected from an extension of the 'half-time system,' and the employment of the hours wrested from books in mechanical preparation for various trades, in military exercises, athletics, and so forth, as well as in acquiring some knowledge of music, of plants, of the habits of animals, and other subjects which will excite interest, command observation, and add pleasure to life.

Much has also been written, and with a good deal of truth, on the evils resulting from the high-pressure system in education, which is deemed requisite to prepare students for examinations, and to enable

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them to contend for the many prizes offered for competition at an early period of life. The stimulus of gain and ambition is resorted to to counteract the dislike of learning, to which I have referred, and leads, no doubt, in many instances, to further evils.

In this age of increasing nervousness, which means susceptibility to impressions or sensibility, the effects of overtension, or overstrain, of the nervous system are peculiarly to be dreaded. They are very insidious, often attributed to laziness, are slow to be recovered from, and are a very frequent cause of break-down in the student's career. Many, from this cause, fail to reach the examination goal. Many, having reached it, had better never have sought it. Some require long periods of repose to regain the elasticity which heavy pressure has weakened, and to refit them for further work. Some never do regain it, and live on to disappoint the hopes which early distinction had raised. It has been my lot to watch many instances of these results, and, I hope, in many cases, to prevent them by strong remonstrances against the seducing but enervating *nocturna lucerna*, and by urgent advice to transfer some hours from work to rest and play, and by instilling the most wholesome maxim, *otiare quo labores*. Happily the playground and the river come more and more to the fore as the compensations for the schoolroom and the examination-hall; and the ambitions of parents are set almost as much upon successes in the former as in the latter. Their instincts tell them, rightly, that it is not by learned feebleness that the race of life is to be won, that the strong, well-knit, and elastic frame is best to be trusted as the home and agent of the sound and effective mind. As I have watched with interest the quickly-growing tendency to increased education of women, and the desire in women to match themselves in the mental arena against men, together with the rise and successful progress of Girton and Newnham Colleges, in connection with my own University, it has not been without apprehension that the associated strain and excitement might act prejudicially upon the sensitive fabric and the finely-strung nerves of the woman. I could not but feel that the consequences to her, and to those who are to come after her, of any deterioration of her physique would be ill repaid by any results that education could bring; and I certainly think that the less of mental competition she has the better it will be for her. At the same time it is satisfactory to mark that the movement has been attended by a corresponding enlargement of the range and amount of bodily exercise. The gymnasium and the lawn-tennis ground are the antidotes, and therefore the correlatives, to the study; and we may have good hope that the increased and well-balanced exercise of mind and body will lead to a better development and greater strength of both.

Ventilation.

A few words on the subject of ventilation. Good fresh air and light are the first requisites for health. Our gardens tell the necessity for them—even for plants, and show that the more the plants are shut up from them the more liable they become to blights and disease, and to imperfect development of colour and form. Fresh air means air in motion. We are quickly conscious of the difference to our powers of work, of attention, or of exercise in a closed room and in one open to the air, on a still day and in a brisk wind, in a screened wooded valley, and on a hill top; and we know that still air is peculiarly favourable to the development of the various organisms which give rise to putrescence and communicate disease. The ventilation and lighting of his house is, to some extent, in the power of each man, and is commonly far too little attended to, especially in the bedrooms. These are generally stuffy, with closed and curtained windows, and are replete with emanations from beds, clothes-boxes, and various accumulations under the beds, and dusty corners. The admission of air, scanty during the day, is permitted at night only through the chimney; and often there is not even that sooty channel. Our open fires, needlessly wasteful, and therefore costly though they be, are, no doubt, a very salutary influence; and they make the contrast between English and foreign houses, which latter are for the most part heated by stoves, much in favour of the English. Still the English houses admit of much improvement, which can be easily made. The air which passes up the chimney from the fire must be supplied through some inlets; hence, when windows and doors are closed, it comes through crevices in the boards, carpets, &c., bringing with it various impurities; and too often demands are made upon the water-closets and sink-traps. The ill-fitting of the doors and window-sashes of the houses of the poor serves the good purpose of providing ventilators. But the better houses have not this safeguard; and as dire experience in high quarters tells us, their inmates too often pay serious penalty for good carpentry, added to that apprehension of draughts which is maintained by an ignorance, or an ignoring, of the fact that fresh air is one of the best preservatives against cold and rheumatism, as well as against fevers and debility.

People go to the seaside and bathe themselves all day long in air, and then wonder that, on returning to their pent-up houses, they feel unwell, perhaps more so than if they had not left them. The amount of 3,000 cubic feet per head per hour, which has been computed to be necessary for the maintenance of the normal purity of the air, cannot of course usually be supplied; but care should be taken in every house that a ready supply of air is provided from the exterior, and that night and day, summer and winter, some window, in the chief passages at least, remains open. In many houses there is a fanlight over the entrance. This should be made to open, which it can easily be, though it very rarely is; and it should be kept open, with very few exceptions, throughout the year. This change would make a great improvement in the sanitary condition of our houses. In the country cottages and houses, the windows, especially in the upper storeys, are too small and too much closed; and it is distressing to notice how often the dwellings are closely beset or overhung by trees, which shut out both air and light. It were a wholesome rule that no tree should be allowed to stand so close to a house that it would touch it if it fell. But trees are too commonly planted without consideration of the space they will occupy, and the shade they will throw, when they grow up; and when they have grown up there is a health-disregarding reluctance to cut them down. The courtyards and alleys in town do not easily admit of rectification. The only effectual plan appears to be that of clearing them away and erecting buildings with better sanitary arrangements on their site, by which, as experience has shown, the mortality of the residents may be diminished

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and it is a common thing for people of this country to refuse to travel abroad, or to prefer to confine their travels in certain directions, only because of the discomfort arising from habits offensive to the senses and to health. I think it is fair at this time to make this claim; and whilst I make it for England, I am sorry not to be able to say that Scotland preceded her; but, at least, I am glad that the principles and practices worked out in the former country have taken such deep root in the North, and that the comfort of life has been greatly increased amongst the population since the time when I spent my early days in Glasgow. This work has not been done without the anxious and severe labour of many men: a whole generation of inquirers may be said to have died in the struggle. Nevertheless, the leader of them all is still amongst us; and one can scarcely speak upon the subject of sanitary reform without mentioning the name of Edwin Chadwick. I doubt if his labours are sufficiently known even now to the general public; but, having had the pleasure and the advantage of being at an early period of life more or less associated with him in his work, I am one of those who have had the opportunity of witnessing his earnestness, his unselfishness, and his power.

It is not easy to tell how many lives he has saved, though calculations have been made on good foundations; but even the number of lives which he has saved would give a small idea of his merits, because we must also take into consideration the enormous amount of discomfort and imperfect health which sanitary appliances remove. Surely we ought to honour such a man. To have led an army so as to have killed but a small portion of those whose lives he has saved would probably have given him the rank of a leader, a Dux—a duke. Can the nation not give him some equivalent honour, or put some stamp on the noble metal of his life?

But whilst we look on the progress of this country in matters relating to public health, and take to ourselves that honour which we think is our desert, we cannot have any feeling but pleasure when we look at the work of a scientific kind which has been done on the Continent, and which is at this present moment claiming the attention of all sanitary reformers. The work done by Pasteur in France is of a kind which cannot be too highly admired. He has probed into the more immediate causes of disease in man, in the lower animals, and in plants, and he has found results scarcely suspected even by those who for a long time believed that the microscope would continue to reveal to us many wonderful and important secrets. It is true that in very early days it was suspected even by Terentius Varro that small animals in the air and low places in swampy grounds produced disease in man, a suspicion founded on what results we have no means of knowing. The history of the microscope from the days of Leeuwenhoek is a history of marvels; but during the days of Pasteur the marvels must have astonished even its greatest admirers. There have no doubt been many workers besides Pasteur, but I have selected in the case of England only one name—one that seemed eminent amongst all others in promoting the cause of public health; and I think it fair to bring forward Pasteur prominently before you, although you are already familiar with his name, and I am not quite sure if it be not the case that by some peculiarity of the action of fame, his name is better known in this country than even that of Edwin Chadwick.

If I mention Pasteur at present it is in order that I may allude to one of his latest discoveries, viz., the attenuation of the virus of at least one disease, viz., that of chicken cholera, by the action of air or oxygen. I do this because it comes in well with the object which I have in view in this address, specially to call attention to the action of oxygen; it is an old subject but not exhausted, and I hope that you will not be too much wearied by listening to the advantages of pure air.

It was an Englishman that discovered oxygen. Priestley called it vital air, with a due appreciation of its wonderful powers. It was a Frenchman, Laviosier, who gave, we may say, its scientific work to do, and called it by its present name. The two nations have worked together for many years, thinking on similar subjects, whether friendly or at war.

If we leave for a moment the attention to individual workers, and consider the ordinary observation of moderately observing men, we find how wonderful is the difference noticed between places and objects which have been closely shut up and those which have had the clear sweep of the air of heaven upon them. We call the former places close or musty, or depressing, or in various ways endeavour to define our objections to them. The Arab, in the free air of the desert, is afraid of even the outskirts of a town. Some people can smell great cities at a considerable distance, and, coming this year from wandering in Norwegian seas and valleys, I fear I am right in thinking that I had acquired the power of perceiving the near approach of places supposed to be intensely civilised.

When a room is shut up even for a day, unless the room be very large indeed, there is always that peculiarity observed by sensitive persons to which there is given the name of closeness. Yet there are people who do not seem to observe this, and who live their lives in rooms in which this closeness may be constantly observed. I have often reflected on this peculiar condition. Surely, if oxygen removes all impurities, these impurities ought to have been removed, since the oxygen of the air is never absent from these rooms, except to such a small extent that the estimation of the change is extremely difficult. If we lift up a window and allow the air to blow into the room, so as to entirely replace the original air, we do not at all times attain sufficient aëration. It takes but a few minutes in a climate like this, where there is considerable motion of the air, to renew the atmosphere of a room entirely; we may judge of this by making a trial upon a visible atmosphere, viz., one pretty well filled with smoke. We see how rapidly with an open window every trace may be removed from the farthest corner, and yet this new air is not sufficient to refresh the room, and closeness is the characteristic still complained of. It is the custom in well-regulated houses not to renew merely the air, but to cause the air to blow through the house for a considerable time every day when the weather permits it. Knowing this for a long time, I wondered very much what was the reason. Surely, I said, there was vital air enough without this long continued current.

Then that remarkable discovery made by Schönbein came to my mind, as I suppose it has to the minds of many other chemists, and I thought it must be the ozone in the air that does the work, and as there is little ozone in a volume, the air requires many repetitions of bulk. There may be some truth in this still; but whether, because the air receives

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imperfect contact with the substances to be purified, or whether the mechanical action of the current is necessary, or some other cause, it is certain that a continual current is necessary for perfect purification. Looking further at this subject, it occurred to me that really clean houses were preserved in this condition by something more than currents of air generally, and that good housewives resorted to the practical method of rubbing by hand, and it seemed clear that no furniture could be preserved from that peculiar condition of mustiness in any house where the doors and windows must be frequently closed, unless the absolute removal of certain substances from the surface were resorted to. And what was this substance that required to be removed? I suppose it to be one of organic origin. In speaking of this, perhaps you will excuse me if I enter with more detail upon my own work than the works of other men. I shall, naturally, feel more at home; and as this Institute will take care that you are made acquainted with all the discoveries relating to sanitary appliances made in all parts of the world, this may be a reason for contracting a field of my observations, and I cannot hope to keep your attention so long as a discussion of the whole range of inquiry would demand, even if I had power to speak so widely.

I may here bring in an account of an inquiry concerning ammonia, which will explain some of my meaning. It is taken from the Memoirs of the Literary and Philosophical Society of Manchester :—

'If organic matter is everywhere, the presence of ammonia is everywhere possible; and if that matter is decomposing, ammonia is everywhere. That is the general statement which this paper illustrates. It is now many years since it was observed by me that organic matter could be found on surfaces exposed to exhalations from human beings; but it is not till now that the full significance of the fact has shone upon me, and the practical results that may be drawn from it in hygiene and meteorology. These results are the great extension of the idea that ammonia may be an index of decayed matter. The idea itself has been used partly, and to a large extent—as illustrated in my *Air and Rain*; the facts now to be given enable us to claim for it a still more important place. The application seems to fit well the conditions already examined; and by this means currents from foul places have been readily found. This does not apply to the substances which may be called germs, whether it be possible to see them or not, because these are not bodies which have passed into the ammoniacal stage, although some of them may be passing—those, for example, which are purely chemical and exert what we may call *idiolyctic* action.

'Ammonia must ever be one of the most interesting of chemical compounds. It comes from all living organisms, and is equally necessary to build them up. To do this, it must be wherever plants or animals grow or decay. As it is volatile, some of it is launched into the air, on its escape from combination; and in the air it is always found. As it is soluble in water, it is found wherever we find water on the surface of the earth, or in the air, and probably in all natural waters, even the deepest and most purified. As a part of the atmosphere, it touches all substances and can be found on many; it is in reality universally on the surface of the earth in the presence of men and animals, perhaps *attached* more or less to all objects, but especially to all found within human habitations, and, we might also add with equal certainty, the habitations of all animals.

'If you pick up a stone in the city and wash off the matter on the surface, you will find the water to contain ammonia. If you wash a chair or a table or anything in the room, you will find ammonia in the washing; and if you wash your hands you will find the same; and your paper, your pen, your tablecloth, and clothes, all show ammonia; and even the glass cover to an ornament has retained some on its surface. You will find it not to be a permanent part of the glass, because you require only to wash with pure water once or twice, and then you will obtain a washing which contains no ammonia; it is only superficial.

'This ammonia on the surface is partly the result of the decomposition, continually taking place, of organic matter adhering to everything in dwellings. The presence of organic matter is easily accounted for; but it is less easily detected than ammonia. It is probable that the chief cause of the presence of ammonia on surfaces in houses and near habitations is the direct decomposition of organic matter on the spot. If so, being more readily observed than organic matter itself, it may be taken as a test, and the amount will be a measure of the impurity. A room that has a smell indicating recent residence will, in a certain time, have its objects covered with organic matter; and this will be indicated by ammonia on the surface of objects. After some preliminary trials, seeing this remarkable constancy of comparative results and the beautiful gradations of amount, it occurred to me that the same substance must be found on all objects around us, whether in a town or not. I therefore went a mile from the outskirts of Manchester and examined the objects on the way. Stones that not twenty hours before had been washed by rain showed ammonia. It is true that the rain of Manchester contains it also; but, considering that only a thin layer would be evaporated from these stones, it was remarkable that they indicated the existence of any. The surface of wood was examined; palings, railings, branches of trees, grass (not very green at the time), all showed ammonia in no very small quantities. It seemed as if the whole visible surface around had ammonia. I went into the houses and examined the surfaces in rooms empty and inhabited, tables, chairs, walls, plates, glasses, and drawing-room ornaments. A (Parian) porcelain statuette under a glass showed some ammonia; a candlestick of the same material (but uncovered) showed much more. The back of a chair showed ammonia; when rubbed with a common duster there was very little. It seemed clear that ammonia stuck to everything.

'If, then, ammonia was everywhere, the conclusion seemed to be that it was not at all necessary to do as I had been doing—namely, wash the air so laboriously; it would be quite sufficient to suspend a piece of glass and allow the ammonia to settle upon it. For this purpose small flasks were hung in various parts of the laboratory and examined daily. The flasks would hold about six ounces of liquid; but they were empty; and the outer surface was washed with pure water by means of a spray-bottle: it was done rapidly, and not above 20 cubic centimètres (two-thirds of an ounce) of water was used. This was tested for ammonia at once with the Nessler solution. The second washing, taken immediately, produced no appearance of ammonia.

Ammonia could be observed after an hour and a half's exposure at any rate; but I do not know the shortest period.'

To me it seemed perfectly clear that the character of closeness was connected with the existence of organic matter, and the organic matter with the ammonia. That ammonia should be found almost everywhere, but in small quantities, was not to be wondered at, considering the universal presence of organic matter in the air and waters of the world. It was when considering these things, the effect of oxygen on this organic matter, that I came to the conclusion that a current of air either carried away the organic matter with it, decomposing it and turning it into gases, or, if this were not possible for the oxygen alone to do this, it might happen that the oxygen destroyed those minute forms which have been shown to be concomitant with putrefaction and decay. A similar mode of thought had previously led me to consider that it was the want of this excess of oxygen that caused confined sewer gases to be so dangerous, whilst the enormous amount of gases coming from decomposing matter, such as on the Clyde, seemed to pass away, leaving comparatively little effect beyond the disgust and the sickness of the present—but to this point I must return. On speaking of the subject I might as well quote my own words to save the trouble of a second expression:—

'This raises a question to be solved; but the fact is certain that fevers have not been traced to the escape of gases of putrefaction when there has been a large amount of water and exposure to the air. But they have been found when the water is not very great in amount, and the decomposition is made under cover, as in sewers. The question arises—Is this owing to the concentration, or to the difference of decomposition in darkness, or to the better supply of oxygen? The effect of sunlight in warm countries does not allow us to suppose that the daylight always produces in vapours an innocent state, although it has a great effect in that direction when there is little water. With us, at least, innocence in the atmosphere seems to be rather something connected with the abundance of air in proportion to the impurity. This air, again, may act in two ways. It may act by rapid oxidation of the substances in water, or by dilution of the gases when formed; and the destruction of putrid matter in water is really very rapid when plenty of air is allowed. This air is brought to the Clyde by the water, and also by the waves, both artificial and natural, exposing a great deal of surface. The air may act also merely by rapid dispersion of the gases. Still, we must not forget that these gases or vapours are not reported to us to produce any marked type of disease over the Clyde, even when they come in a state so concentrated as to produce sickness; whereas gases from sewers, in a condition which may not produce immediate illness, may produce in time typhoid fever, as we are credibly informed. We must conclude, then, that it is not mere dispersion, but that it is a more thorough putrefaction and oxidation which takes place in the Clyde, and a more complete destruction of the organic substance by the abundance of air, than can take place in sewer water, whatever the senses may indicate to us. Of course, we must ever give some credit to the flow of air up the river, and the ever-fresh breezes that come from the Atlantic, as well as the mixture of air with water caused by steamers.'

If Nature had contrived no method of destroying such seeds of death, populations such as this is would never have grown up. And what is the method? That method is—first, putrefaction; at least I know of none other, except the concluding portion of the work—viz., thorough oxidation. When, therefore, you see the Clyde seething with gases of putrefaction, and when you smell it to such an extent that a feeling of loathing is produced, you may remember this—that the work of destruction is going on with a wonderful rapidity, and that the enemies of life are being slaughtered there millions upon millions, never to appear again in a similar form though other generations of them may rise up. As putrefaction seems not to take place without the action of organisms I had the idea that it might be arrested by an abundant use of air, and I had some belief that the oxidation took place very rapidly after putrefaction. It was when examining this that I found it necessary to touch also upon the question of nitration in water. When nitrogenous bodies decompose with an abundance of oxygen the nitrogen becomes oxidised and nitric acid is formed. I had long suspected that the reverse also took place; and that when there was an excess of putrefactive matter oxygen was absorbed, and even removed from the nitrate, whilst free nitrogen was given off. This process I was able to verify by carrying it on in the laboratory. It was clear then, and beyond all cavil, that rivers could purify themselves in time and organic matter be thoroughly removed. It was clear that organic substances, that germs of disease, that microbes, and the smallest organisms themselves, were all subjected to this universal and unsparing attack of putrefaction and oxidation. The results, as expressed in my report of the Rivers Pollution Prevention Act, was expressed in the following terms (pp. 26 and 27):—

'Putrefaction destroys organic matter without the influence of oxygen. It breaks up organic compounds and destroys organisms. The evidence seems to indicate that it destroys even those bodies that produce disease, but that in certain conditions it produces others. This is a point not to be enlarged upon without more knowledge, but it is evident that by putrefaction we get rid of an enormous amount of offensive matter. Oxygen cannot enter under the surfaces of actively putrefying bodies; but wherever it is allowed to enter by the putrefaction being less active an action begins which in time completes the destruction of the body. We are not, therefore, to suppose that the germs of disease can resist all these efforts of Nature to destroy noxious things; nor are we to suppose that an invisible germ of disease can pass on from stage to stage unaffected by the putrefaction of sewage and the action of air. We must believe for the present that it is not so. In water we see perfect purification, nitrogen itself being lost.'

'In ordinary putrefaction, sulphuretted hydrogen comes off in abundance, with much carbonic acid and some nitrogen. Oxygen resists this action, and if the oxygen is supplied in a concentrated condition a change takes place; nitrogen is evolved as the principal gas, and a decomposition of nitrogen compounds takes place. Nitrogenous bodies are thus destroyed—in one manner by their voluntary putrefaction, in another by oxidation. Up to a certain point, not determined, the greater the amount of nitrogenous bodies the more rapid is their decomposition.

'The oxygen of the nitrate passes in part to the carbon; some will be retained, forming a carbonate.

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I have not estimated how much, or if all, is taken by the carbon.

'If the solution is weak, the nitrogen takes up the oxygen, and does not allow it to pass away, thus forming nitrates.

'Putrefaction and oxidation are two well-known modes of destroying organic bodies at ordinary temperatures. The second is not proved to be connected with organisms.

'How far, then, can oxidation, or a great supply of air, be employed to destroy putrefaction, or to purify?

'The bearing it has on the analysis of water will be clearly seen by chemists. The bearing on the sewage question is also interesting. Substances and living things may be carried by the rapid sewage system into the range of a new activity before undergoing that putrefaction which breaks them up in proximity to us or in the sewers themselves. It seems to point to a plan of causing the destruction of organisms by putrefaction and subsequent oxidation or by chemical action. At least, it seems to me that we require to learn if it be true that any of the germs of disease, or which germs of disease, will live in an abundance of good air. We know that abundant dilution will render them all ineffective. It is probable that there will be a difference amongst them in this respect, whilst all will yield to the double action of—first, putrefaction, and then oxidation.'

Certainly at least this is one of the conditions, and now we may ask what is the character of these changes evolved in the word decomposition? I have said the bodies arising from the decomposition may be very numerous; if so, the modes of decomposition must be very numerous, and the term used, viz., putrefaction, cannot represent only one chemical change. There is one stage of it, however, which seems to be more efficient in breaking up the compounds than any other, and this takes place when the sewage has a certain amount of air allowed to it. How much is not very clear, but there is evidently a limit. Within that limit thorough putrefaction begins, organic substances rapidly disappear, and gases in great abundance come from them. Carbon and hydrogen, sulphur and nitrogen, each in its own way, either in combination as the carbon for example always is, or as bodies perfectly free. It is this grand breaking up of fœtid organic matter which nature has contrived in order to produce purification, otherwise this city (Glasgow) would be sending down its river such loads of impurity as even that willing stream would scarcely be able to bear. I wish, therefore, to bring forward now more emphatically the doctrine that putrefaction in a certain stage is one of the greatest of purifiers, and perhaps the most complete that nature has devised. It has often been asked what will become of those many poisonous emanations which arise from the human body even in health, and from those still more dangerous substances which are generated within it during many of these multifarious diseases to which man is subjected. The germ theory of disease has caused alarm in many directions, and it has been imagined that some little germ of disease passing into a sewer or pure river might carry with it power to infect other organisms to such an extent that there was reason to fear for the lives of all inhabitants on its banks. This extreme application of a theory might not be unreasonable were it not that we know from results that no such power exists in any of those germs known to us.

Let us consider the number of polluted liquids which pass from the houses and hospitals from such a city as Glasgow, and the fact that so many of its inhabitants go down to the banks of the Firth, towards which the waters of the Clyde flow, and receive their health and strength for themselves and their families, and we shall see how absurd the ideas have been concerning the power of individual germs, or even multitudes of germs in such situations.

From the sewage of a room, as we may call these impurities, we may readily pass on to a subject which has always been important in the eyes of those who have any appreciation of the importance of the attention to public health. It is a subject which impresses upon the attention of every town, and it is one which has for many years caused the inhabitants of Glasgow to think seriously, viz., the treatment of sewage. It has happened that some of my latest work, as indeed some of my earliest, has been upon sewage.

It is remarkable how rapidly sewage enters into putrefaction, and to know the results of this putrefaction has been a considerable difficulty. The gases from sewers have been found guilty of producing a peculiar form of fever, very well known to medical men in some of its stages, and apparently so definite that it may be considered as ranking with one of the chemical tests in its strictness. The gases which come from it are the results of the decomposition of organic matter, and the number of compounds into which the material of animals may be broken up is so varied that at present it may be said to be entirely beyond our ken. These compounds vary in character to such a degree that they may form the most innocent gases, the most wholesome food, or the most virulent poisons, venomous substances that destroy entirely vital functions of the human body in a scarcely appreciable time. Some of these obnoxious bodies arise from the decomposition of sewage, and, as already said, seem to be formed at some particular proportion of the supply of air.

It is easy to see that it is a mistake to suppose that by sending putrefying liquids down to lands we are giving these lands all the sustenance which the sewage originally contained. If we wish to use them as sewage it is better to use them before putrefaction, the loss by putrefaction being great. I suppose we can scarcely doubt that putrefaction takes place more rapidly when the organic matters are diluted to a very considerable extent with water. Having made many experiments in order to learn the condition of the air found lying over somewhat solid putrid substances compared with the same substances very diluted with water, it was found that the greatest amount of ammonia and the most offensive odours were from the more solid. This is quite in accordance with the explanation given of the more complete disruption of the organic matter in water, and it was these experiments that led me first to think of driving the air through sewage matter in order to produce oxidation, expecting readily to form nitrates, and in the belief also that excess of air would be offensive to the microzymes, although a small amount seemed necessary for their activity.

The most complete experiments on aeration which I was able to perform were done by the apparatus of Dr. Storer and Mr. Cranston. The Messrs. Storer were good enough to put at my service two of their revolving screws, which are used to agitate the water, to draw down air into the centre, and to send

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it out at the circumference of the vessel. For this purpose they put also up in my laboratory a gas engine, to drive these screws, and I was thus provided with very efficient apparatus, for which I cannot sufficiently thank them. The result of the aeration of sewage, and of other liquids, containing organic matter to a similar extent, was, that, in all cases, putrefaction was delayed by aeration. The dissolved oxygen also recovers itself in the aerated specimens better than in the non-aerated. This shows that aeration not only prevented putrefaction, but prevented also the chemical action consequent upon it. It had, in fact, to a large extent, and for a considerable time, rendered the organic matter inert, or nearly so. Nitrates are formed also more readily in the aerated than in the non-aerated specimens.

There are some curious peculiarities connected with the formation and disappearance of nitrates, but with these details I shall not trouble you. It was in looking for nitrates and measuring the amount of ammonia in the aerated and non-aerated solutions, that I observed how much the ammonia diminished in amount, and sometimes the air passing out from the water contained a strong smell of ammonia. In working with the apparatus described, a constant loss of ammonia was observed. The sewage was tossed about, the volatile matter carried up with the currents of air, and had no opportunity of returning. Work of a similar kind had been done by M. Lauth,* which has been published in the *Comptes Rendus*, where the following is stated :—

'It is well known that to obtain the ammonia from sewage has been the aim of chemists for many years ; and to make use of it in some form or other, without extracting it, has been the study of many engineers. The amount of ammonia, as we have long known, is great in sewage, but we have not known how to remove it. The amount, however great in the bulk, is small indeed in proportion to the amount of water, being from four to seven grains, very often not more in a gallon of 70,000 grains. The loss of ammonia, when using the apparatus described, suggested at once a method of obtaining a revenue from sewage.'

It will be seen that the results obtained by M. Lauth are far greater than those obtained by me, and the product or increase of ammonia by putrefaction is remarkably so. Could we obtain such results in our sewage I think I could scarcely doubt the possibility of profitable working ; but probably the material itself, and the temperature of the country, may explain its most important differences.

If we could take only one grain of ammonia out of one gallon of sewage we should have from 1,000,000 gallons 1,000,000 grains = 142·8 lbs., let us say 140 lbs.

Let us suppose there are in Glasgow flowing from the sewers daily 50,000,000 gallons, and we should have 7,000 lbs. of ammonia daily ; this would give us in a year above 1,100 tons, which might be put down as somewhere nearly 60,000*l.* But can we obtain one grain out of every gallon? In the laboratory, with a small apparatus, this has not always been the case, but if lime is added to the solution the ammonia comes off more freely, and experiments have been made in which about two grains per gallon were obtained. In one experiment made in Glasgow, with one hour of aeration, two grains per gallon were obtained without lime, but this was in a very strong sewage containing nine grains of ammonia per gallon. Sanitarians are very glad to hear of great sums of money being obtained by processes which tend to health, and in order to please them with a certain vision of glory we may draw out the calculation on the supposition that all the ammonia was obtained. Let us take only a moderate sewage, containing only six grains of ammonia per gallon, and we should have an amount of ammonia produced per annum equal to 360,000*l.* But is this within our grasp? The ammonia is removed from the liquid, but it is carried away in enormous volumes of air, and from these volumes it must be extracted. I think this may be done, but I shall not dwell upon it. You may suppose I was very much pleased in obtaining even some slight hope of the solution of the great question. We sometimes expect a little credit for doing any useful work or even making a step in advance, but when writing the account out and making some inquiries I found that instead of deserving credit for my labour I deserved only blame for my ignorance. It was found that the idea had come into the mind of another ten years before, but had been thrown away.

A provisional specification had been made out in 1870. The first projector seemed to have lost confidence in his principle, but another patent was taken out by Messrs. Hills & Biggs in 1872 for a similar purpose, one by Messrs. Welch & Scott in 1876, and one by W. L. Wise in 1878.

I can only, therefore, give my version of the subject : still, I think it is a useful one, and I published it in my report to the Local Government Board on the Prevention of Pollution in Rivers, so that others might make the next step, and have given details not elsewhere given. In the passage of air through water the gases are removed, and some volatile substances, whilst the air, being greater in volume, takes their place. The volume of air is a decided objection in working this process. I was desirous of diminishing this, and therefore resorted to the air pump, and tried if it were possible to exhaust the water of its dissolved gases. In speaking of this part, I said we could not expect to do the same work with a small amount of air.

This may be done to a large extent by pumping them out ; and it is remarkable how much is done, at least on a small scale, in a minute or two. I cannot say that a result has been obtained equal to that by a current of air ; and we must remember that the current acts oxidisingly as well as by displacement, but a great deal is effected by the exhaustion methods. The gases come off strongly impregnated with organic matter. They may in this case be sent through a disinfecting process if the ammonia cannot be got out. It was expected that by taking them out in a concentrated state they could be passed through acid, and the ammonia

* *Paris Sewage.* By Ch. LAUTH (*Compt. Rendus*, 84, 617-620).—Two vessels, one containing ordinary sewage, the other sewage saturated with air, were placed aside, to watch the effect. The former soon became black and offensive, whilst the second, after two months, was still inodorous. The chemical action of the aeration was as follows :—

	Insol. N.	Sol. N.	N. as Nitric Acid.	N. as Ammonia.	Total N. by vol.
Before aeration..	14·70	20·65	1·176	8·4	38
After „ ..	8·05	26·95	1·122	14·0	38

The effect of lime on the sewage was next tried : it remained inodorous and colourless after two months, and gave on analysis the following results :—

	Insol. N.	Sol. N.	Nitric Acid.	Ammonia.
Without treatment	14·70	20·65	1·17	8·4
Treated with lime	10·15	25·55	2·60	18·20
Treated with lime and aerated.	6·65	28·87	2·12	21·35

These results show that the development of putrefaction producing sulphuretted hydrogen may be avoided, not only by treating sewage with lime, but by mere aeration.

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removed through a small absorbing space, thereby getting over the difficulties which may be expected when we try to absorb the ammonia from a large amount of air. This, however, was not found in practice to take place to a sufficient extent. Very little ammonia was removed by pumping.

At the same time it is very probable that the failure was not inherent to the process, but caused by the limited and imperfect scale of laboratory operation. In some cases it is probable that ammonia would come off in this way (that is, when the sewage was stronger than usual). I should be inclined now to expunge the words 'imperfect scale of laboratory operation.' Still I looked to the air-pump as a valuable addition to the aeration, or rather as a preliminary to it. As I mentioned, 'if this method of pumping out the gases were adopted, it would only be a preliminary to aeration, which might be affected either by allowing the air to enter, or by assisting it.'

As Dr. James Young, lately departed from us, was to me an old and intimate friend, it was natural I should speak to him of my work on water. He was extremely interested in the results, and after thinking about them, told me he had an improved method for the treatment of sewage, as mine would be too expensive.

His experiments showed that strong ammonia liquor lost ammonia, until the amount remaining was only 1 in 210,000, whilst weaker solutions became concentrated until they reached that point, and his idea was to boil off the ammonia. This seems certainly a very bold thing. It was found that by distilling 5 per cent. of the sewage at 212° the bulk of the ammonia was contained in the distillate. By increasing temperature and pressure it still increased, whilst at 70 lbs. pressure almost the whole of the ammonia could be obtained by distilling over 1½ per cent. of the liquid, the expulsion of the ammonia being also facilitated by the injection of a small quantity of air. Dr. Young's idea at this time was to distil off ammonia at a high temperature and pressure, so as to obtain a concentrated ammoniacal distillate, and afterwards to recover the heat by passing the exhausted liquid through a series of pipes surrounded by cold sewage, to be heated to the boiling point in turn, thus making heat a part of the working plant; but on inquiry it was discovered that to cool a quantity of liquor from 280° F. (= 138° C.) to 60° F. (= 14°·5 C.) by raising an equal quantity of liquid from the lower point to the higher, such a great conducting space would be required as to make any such process quite impracticable on such an extensive scale.

It was found that a low temperature became one of the primary conditions of success. He found that, by using an exhausting air-pump and raising the temperature to about 80° F. = (26°·6 C.), only sewage which contained five grains ammonia per gallon was almost entirely deprived of it in a few minutes. This is the central experiment upon which his process is founded.

In other words, he found that, instead of passing air through the sewage, it was sufficient to pass steam at a very low tension, and, consequently, with an enormous bulk. This did the work of the air, and the ammonia was absorbed from it instantaneously by the acid. It is difficult to know from smaller experiments what may be done on the large scale for the sewage of a great city; but it may be mentioned, as a result obtained by Dr. Young, that when he passed the sewage down a coke-filled tower, which was rendered vacuous, and which gave, from a great expansion of surface, a ready means of evaporation, he considered that he had put the problem in a satisfactory form. From a tower, or cylinder, 5 feet 6 inches high, 5 inches in diameter, filled with irregular pieces of coke, about 4 inches cube sewage was exhausted of 80 per cent. of its ammonia, at the rate of 5 litres per minute, and with a distillate of 1 part of ammonia in 1,200 liquid. Taking this result as a standard of calculation, it was believed to demonstrate that the process was theoretically capable of extracting ammonia from sewage on a commercial scale, and that any practical difficulties ought not to be beyond the powers of chemical engineers to surmount. It was believed that addition to the height of the tower would enable the steam to be charged with ammonia to 1 in 800, whilst increased pumping and condensing power would lower the working temperature to 70° = (21°·1 C.) or less. The vacuum used in this experiment was equal to ½ inch, or 12·7 mm. of mercury. It was believed that the temperature of 70° = (21°·1 C.) was one which could be obtained on a large scale, perhaps at all times, whilst at other times it may be said to be the temperature of the sewage.

I cannot forbear remarking here on the boldness of this conception of Dr. Young's. Perhaps some of his assistants will write out fully the details of his work as they were carried out with a care which never ceased as long as he had strength. One never knows what may be the end of any careful inquiry, and I do not presume to give a very decided opinion on this subject, but I incline to think that for some strong specimens of sewage this plan may be found both practical and profitable. I believe that amongst the papers left by Dr. Young there are extensions of the idea of the steam sufficient to show that he had mastered the whole thoroughly, made advances, and explained the matter better than had previously been done. Many of these points I have not had an opportunity of examining carefully; I suppose they will be brought into order by the work of his successors, and I hope that engineers and others directly interested in such matters will not allow the promising ideas to pass away without leaving benefits behind. Dr. Young's use of steam was not so new as he thought, but I leave its history.

It was not my intention to say so much about sewage. The subject which I mainly intended to bring before you was mainly that of oxidation. This is a very old problem for chemists, and every beginner must learn the strange effects produced by this wonderful gas—oxygen. We must still think as beginners, and go back to our earliest thoughts in science. Some physiologists tell us that our life is a mere product of oxidation, that even our death is a result of the more violent attack made on us by the same gas. It would seem, therefore, as if this wonderful agent had the remarkable power of blowing hot and cold, of producing strength and weakness, being our greatest friend and an enemy from which we cannot escape. No wonder, then, if we give it many contradictory duties to perform. It was always known that pure air had a cleansing power, and it has long been known that oxygen was the main agent there, and I have already spoken of the value of wind blowing through a house to render it pure; but it has somehow happened that its rapidity of purification has never been brought so clearly to

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my mind as by these experiments on the purification of sewage.

The act of purification is to be seen here rapidly. It is not the work of days or weeks, but the work of minutes, and the belief is taken out of the region of reasoning into that of the simplest observation. It might seem rather absurd to attempt to prove this; nevertheless, there may be many minds to whom this proof may be useful, since it has been useful to myself, who may claim more familiarity with the subject than is common to the generality. It brings us, also, to that point which may be said to be the central point in all sanitary reforms, viz., the importance of pure air. There are many other points, but this I incline to hold as the first.

A learned professor, just come from the Continent, called on me the other day and spoke of the wonderful instinct of washing which seemed to pervade the households of Holland, and he had observed one woman washing down the outside of her house, and another washing the trunk of a tree which stood opposite her. The very boys seemed to enjoy themselves by picking out weeds. And he asked me the question—Does this extreme of cleanliness conduce towards longer life? Can we say to any man, wash and be clean and you will live longer? Yes; but the question is an extremely complicated one, as all questions regarding natural phenomena are. Cleanliness is wholesome, and I believe that those who are clean will live longer than those who live in filth. But there are some curious anomalies regarding this nevertheless: we do not hear of the longest lives, those above one hundred years, being found in that class of society which is most attentive to cleanliness. It seems rather in the opposite direction. I have found it interesting for some time, on receiving the Quarterly Returns of Births and Deaths, to observe the number of persons who die at very advanced ages in Ireland. These persons do not belong to the higher but to the lower classes.

In Scotland also it seems to be the case that it is in the lowest class, in classes where cleanliness is least cared for, where these extreme cases occur. There are people who simply solve the question by denying the extreme age. I have not seen the propriety of questioning these higher ages to such an extent as some have done, any more than those ages which are lower; and I feel rather inclined to attempt the solution instead of resorting to a course so old fashioned and easy as that of Alexander the Great—viz., cutting the Gordian knot by denial. At the same time I do not deny that inquiries made on this subject with a desire to obtain the truth, have been very valuable, and have abundantly proved that gross exaggerations have been made, and that care is absolutely necessary. Although I think a good deal in Ireland is due to tenacity in the race, which gives the people a lightness and a vigour even in very trying circumstances, yet the results seem only explicable by supposing that those who have lived so long in conditions so unfavourable to health, have been gifted with or rather, should we say, have been deprived of that sensitiveness of body and mind which in one case would have raised them above the lower levels, and in the other have made them more liable to give way to the wear and tear of life.

The same Professor told me that amongst the scattered cottages of Holland there was much poverty, but cleanliness everywhere was remarkable. When I thought of the cleanliness of the Dutch cottages it seemed to me a pity that women also had not been amongst the preachers who used to frequent Holland and had brought to Scotland the habit of cleaning, and had fixed it in our houses in a manner as unchangeable as the habits of the pulpit.

But now we must return to think more closely on the action of oxygen. If the oxygen is found to diminish the activity of those minute moving particles which form or produce a disease called chicken cholera as Pasteur has shown, and if oxygen also puts an end to the decomposition in sewage in a manner rapid and decided so that decomposition will not begin again for some two or three weeks, according to the weather, we may ask how far it may be used directly in the destruction or weakening of microbes in other situations. When Dr. Koch found bacilli peculiar to consumptive patients and existing in their lungs, it was natural for me to ask him whether some excess of oxygen might not prevent their growth, as I found a similar result in sewage. However, it was a question more easily put than answered, and I suppose we must leave it. We get here into a number of difficulties which can only be solved by careful observation, and I do not know yet how far we are to understand what is the tenacity of life of various forms of microbes in various gases. It is clear that experiments relating to the existence of life in particular gases are not sufficient for us, because, as Pasteur shows, although they may live, they have in certain conditions, if not entirely, lost their power of giving disease, or, as he says, become attenuated. Here we have a large field before us, and it is to the attenuation or destruction of these forms of life that microscopists and physiologists must now attend. In the long discussions, and somewhat bitter ones, that have taken place regarding vaccination, I do not know that any one has attempted to act upon the agents in a manner suggested in the case of chicken cholera. I am not a medical man, and must speak of these things only as a chemist; but it seemed to me natural to think that if some modification of the matter of small-pox could be obtained by oxidation, another step would be to attain that modification in a still greater form upon the bodies of the patients. As we have seen that oxygen is the great purifier in the regions of the air over the great oceans and in them, and is working even in the soil in our towns, and in our houses amongst our furniture, and upon ourselves within and without, and that it so rapidly removes that disagreeable matter of our town sewage, let it be compelled to purify even disease itself when it has attacked the human body. This is only an extension of the great idea of sanitarians that pure air is wanted all around us, and that by pure air we can obtain one of the first steps to health, although there are cases where this idea must be modified.

It is interesting to consider the cause and the production of zymotic diseases according to the various views which mankind have had. The angel of death has always been sure in his work, but his work has been unseen unless the darts of Apollo which caused the plague in the Grecian army were the well seen beams of the sun acting on masses ready to decay. Now the agent is believed to be armies of numberless living particles, one may almost say, totally invisible to the naked eye and known to a few only who use the microscope. Whence do these armies come, and how are they fed? If they are formed readily out of the substance of the person whom they attack they do as

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other armies do—feed upon the plunder taken from the enemy. But if so, why do they ever cease as long as food for them remains? There surely must be some limit to their capacity of growth, otherwise destruction to the attacked would always follow. I do not know if I have read sufficiently on this point to know the general opinions, if indeed there are any; it may be that there is formed within men and other animals a certain amount of material from which bacilli may feed even in healthy bodies. It may be that this material may be more in some persons than others, and it is just possible that this may be removed by certain agents, one of them being the oxygen or pure air which I wish you to think, and by the various exercises and changes of place which enables the oxygen to be more active within us.

Still there are other things to be thought of, and surely these little bacilli which have been mentioned are under some other command, and they themselves may have a general whom they learn to obey. If their growth depends merely on the food supply, then we are brought to chemical agency affecting their increase or decrease, and this agency in a limited sphere, but their lives may be regulated by other movements, some on the earth and some in the stars. The sun's direct rays must affect them as it does all things around us, and its indirect action when it sends out magnetic currents that bring the earth in constant and varying sympathy may also influence the lives of the minutest creatures, as they no doubt influence the still less observable chemical action.

There was once a considerable discussion as to the part played by organic life in fermentation and putrefaction; and Liebig took up the chemical idea and objected to the belief that microzymes were necessary for chemical work. He lost, apparently, the day; but under the life of the microzyme chemistry and physics are at work, and how they manage to produce the result is still a problem to us. We must not suppose that when chemical action is not violent, as it sometimes is, that it is entirely absent. If we take a liquid containing a strong solution of crystallisable salt, and add a minute crystal to it, how readily the whole mass takes the form of this crystal; and yet how weak, apparently, is the first, and how slight the connection between the two, whether chemical or physical, or both. This leads us to think that the various powers of creation are by no means inert in the production and the continuance of disease; and the lower we go in the scale of animal life more likely are we to meet with causes acting in a manner different from those of higher organisms, and more allied to those of the inanimate world. This would bring us to think of changes caused by the conditions, both of the earth and of the air, and naturally show why this section should point to meteorology and geology.

The action of weather upon health is one of the important points included in meteorology, and some people may suppose this to be the only point; but I think that although the complicated changes that occur giving various proportions of heat, of light, of wind, and of rain have an enormous effect upon us, and, as Mr. Baxendale has shown, are the greatest agents in producing rapid changes in the mortality of the country, I think there is still much to do in the examination of the constituents of the atmo*sphere, esp*ecially those minute bodies and agencies which are less under our observation. I should have been glad had I been able to say that the habit of the chemical examination of the air had taken deeper root in this country, and attached itself to establishments for meteorological study. I spent some years upon this, but hoped that it would be continued by others.

I have indicated here one simple method of observing ammonia as an indication of organic matter, and published after my book on *Air and Rain*. And I should like to call attention to another point, viz., the measurement of the light; and to bring this in as one of the phenomena which may receive constant attention, because it affects the health of man, of animals, and of plants. There has been an attempt amongst meteorologists to give the amount of cloud day by day, observations which are very imperfect; there is, however, a better attempt, and a more successful one, to give the amount of sunlight direct, and that is to be much admired. I have endeavoured to bring forward a mode for measuring total light, whether sunlight or otherwise; it was founded on a chemical decomposition of iodide of potassium, first observed by Dr. Leeds, of Philadelphia, but applied by me to find out the comparative light of town and of the adjacent country. The differences were found to be great. I hope that experiments, such as these, which I have published, will be attached to observatories. I feel sure that if they be continued for some years they would enable us to account for much which is at present perfectly dark. I have applied the same reaction to the estimation of the brilliancy of water. Although I cannot say that brilliancy is an absolute test of purity of water, it is at least an important characteristic.

In this country we should come badly off indeed if we depended for our vitality on direct sunshine, and I consider it much more important to obtain the total luminosity under which we are compelled to live whether the sun's rays are direct or not; and however gloomy our climate may be, and at times depressing to the spirits; the darkness does not seem to exist amongst us to such an extent as to prevent this country from being one of the healthiest in the world.

The effect of meteorological conditions as affecting disease in many of its stages—or, as we may say, affecting health—has been examined so well by Mr. Alexander Buchan and Dr. Arthur Mitchell, that he would be a very diligent student indeed, and a very fortunate man, who could advance before them in such knowledge, although, I suppose, some day even this must be done.

It does not seem at all probable that we shall at any time be able to affect in any substantial way meteorological conditions, but this is rather hastily expressed: we have unquestionably altered the climate of a large portion of England. Drainage has removed many sorrows from the population—fever, ague, rheumatism, and the various affections which we put usually under the word cold. How much these surface changes, which may be called geological, have affected the atmosphere so as to alter the rain-fall, may not be so clear. Interesting data, however, have been collected by Mr. Alfred Fryer of late years, showing that the effect in some cases has been considerable.

We can sometimes affect meteorological influences by the use of cannon-balls by shooting our enemies in the air, as we shoot other enemies. For instance,

in the case of the waterspout, or by the use of explosions, we may set the atmosphere shivering until it can no longer contain its rain. Shall we ever be able to influence the greater storms of the world: those, for instance, that come and sweep over the continent of Europe? There may be a place where, like other things, storms begin in infancy; and, like other infants, they may have very tender lives, which in their case it would not be wicked to destroy.

One can scarcely avoid at this time pointing to geological phenomena as deeply affecting human life. In our own lifetime we have heard of violent changes in certain parts of the world, and only last month of some of the most frightful occurrences to which nature has ever subjected any known portion of land. Such changes must affect the health of those who survive the catastrophe, such as that in Java, because of the change of surface, and the destruction of the usual healthy condition of the soil, as well as the interruption to the usual supply of food.

But the condition of the surface of the ground and the influence of the violent phenomena are subjects of themselves too interesting to be spoken of in a fragmentary manner, although the second of these may happily have little interest for us who live in a country where the minutest vibrations only are observed in its foundations. The first of these, viz., the condition of the surface, is one that can never cease to deserve our attention, as its preservation, with its due amount of heat and of moisture, must always be to us of the greatest importance. (Much interesting matter on this subject will be found in Hecker's *Epidemics of the Middle Ages.*) I shall finish by remarking only that we have still much to learn regarding the effect of surface on the air, and I hope that some papers will be read on this, bringing us up to the latest period, since a good deal of attention has been given to it, but I cannot here bring forward the work done in Germany and in America, having been compelled to go for a holiday at a time when in ordinary cases I would have been laboriously collecting from all sources matter for your instruction and entertainment. I have more matter in hand, but I trust that for the present I have brought forward subjects enough, although, in a fresher state of health, I might have attempted to press more on your attention.

I have been requested to say something about coal-smoke. I fear it is not to be cured until we change our mode of treating coal, and new discoveries point to a time when the products of distillation will be so valuable that the heat produced may, as a friend expressed it, be obtained as a waste product.

Meantime, can the people of Glasgow not refuse to patronise steamers, that make their great sanitarium—the Firth—a region of unwholesome vapour? Let steamboat owners understand that their craft is in danger.

NOTE.—So early as 1848 I had come to the conclusion that 'permanent chemical compounds, gases or liquids, are not capable of acting as infectious or contagious matter, that is, cannot convey disease.' I may add, also, some sentences from the same paper, printed by the first Board of Health.

'When fermentation has ceased, that is, when the materials on which fermentation acts are worked up, and their action begins under favouring circumstances:—when, for example, alcohol is formed to the utmost extent, the next substance is entirely different—vinegar appears; this induces another action, so that the cessation of one fermentation supplies the conditions for the commencement of another.'

'If a pestilence were caused by the condition of the air generally, it would go with the wind, it would not take seventeen years to go round Asia, Europe, and America. It would act as constantly as the changes of the weather, that is, in many places at the same time, but it takes leaps, not very long, and acts fitfully and freakishly. Human beings are not the only conveyancers, but filth, that is, fermentable matter is, it is conveyed along all places, giving out effluvia, but the effluvia of filthy places did not produce cholera till the disease came near us from Asia. Organic matter may be called the conveyancer of cholera, that which takes cholera itself and conveys it to others.'

'At the same time this shows us why clothes should be considered dangerous; not porous materials but organic materials, which are capable of taking the disease, whether from the amount of organic effluvia given out by the substance, or by the amount of matter which they retain from the body, may be a question. That is, whether the substance itself of clothes, or the person wearing them, be capable of taking pestilence or both. Moses mentions the fact of clothes and skins taking leprosy.

'This'—that is, the reasoning—'explains why other diseases should disappear when cholera and plague come. The one fermentation sets all the others in the same course, and absorbs the action of organic matter in the air. It is a matter of curious inquiry, this one power putting down all the other powers. New fermentations arise; when one is doing its work it produces entirely new conditions; where it works, these new conditions rouse new actions, and it seems, in the complexity of organic nature, as if the power of producing novelties were increased by the number produced. Man, capable of one disease to-day, is capable of another to-morrow.'

And in 1852 I used similar words:

'In this way various ferments would produce various substances, or a substance putrefied might go into plague fever or small-pox, just as parts of the body do. Filth, therefore, is a conveyance of disease, taking the lead of any infection that happens to have the reins in its hands at the time. No wonder, then, if all diseases disappear before a great disease, one great ferment banishing the others. There cannot in one liquid be the mucous, acetic, and alcoholic fermentation at once. But they may come in succession. So, after one disease, another may arise on its remains. Is this the explanation of the rise of new diseases, or the history of the progress of some we know, which go on from stage to stage?'

WORCESTERSHIRE SAUCE AND CHOLERA.—The proprietors of this excellent sauce tell us that it is good with everything, from soup to cheese, but a new use has lately been found for it. A correspondent of the *Broad Arrow*, serving with the Army Hospital Corps at Ramleh, Alexandria, writes:—'The treatment of the cholera cases is at first a strong stimulating mixture, to promote reaction, brandy, champagne, and aconitine, atropine, and pilocarpine injested hypodermically. They gave one man a good draught of "Worcestershire sauce," which has been found an excellent thing.'

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ON SOME SANITARY ASPECTS OF HOUSE CONSTRUCTION.*

By Wm. Wallace, Ph.D., F.R.S.E., F.C.S., F.I.C.,

President of the Philosophical Society of Glasgow.

Last winter I read a paper on building-stones to the members of the architectural section of the Philosophical Society, and the subject attracted a good deal of attention among the architects and builders in the city, especially as it had a direct bearing on the selection of a stone suitable for the erection of the magnificent pile of buildings about to begin by the Corporation of Glasgow. An opinion was also expressed that the chemist might give valuable information, and make useful suggestions to the architect and builder if he would devote his attention to the construction of buildings. The encouragement received on that occasion has induced me to bring before the architectural section of the Sanitary Institute a short paper on some of the sanitary aspects of house construction, excluding entirely from consideration the important subjects of drainage and sewerage, which I leave to others who have made them a special study.

Granting, then, that a house is well drained, and that the plumber work is properly trapped and ventilated, what is wanted to make it a healthy residence is that it should have plenty of light, and that it should contain at all times air pure and dry, or at least as pure and as dry as may be possible. The subject of light may be dismissed in a few words. The importance of having large windows is perfectly understood, and so far as isolated buildings are concerned it is unnecessary to say anything. But as regards street architecture, it is of the utmost importance that houses should be built of a height, bearing a direct relation to the breadth of the street in which they are situated; hence the paramount importance of having enacted by Parliament rigid building regulations for cities and towns, in order to prevent the erection of tenements of such a height in proportion to the breadth of the street that the windows in the lower storeys get little or no sunlight. This is a subject which has been thoroughly discussed in this and other cities, and I hope that in course of time more stringent rules than we at present possess will be enacted. A fair proportion in this latitude is that the house should not exceed in height two-thirds of the breadth of the street; thus giving three storeys in height for a street of 45 to 50 feet wide, and four storeys for one of 60 to 70 feet. I say, advisedly, in this latitude; for while at the equator the sun at mid-day is perpendicular or nearly so, in high latitudes it forms with the earth's surface an angle more or less acute. Hence a street in Cairo of only 15 or 20 feet wide may be better lighted than one of 40 or 50 feet in Stockholm. As regards the direction of a street, I should prefer to live in one placed as near as possible north and south; in this case, and taking the west side of the street as an example, the sun shines from morning till mid-day in the front, and from mid-day till the evening in the back of the house. But in a street running east and west, the houses on the south side get scarcely any direct sunlight—in winter none at all—in front; while those on the north side are equally unfortunate as regards the back rooms. No apartment can, in my opinion, be considered a perfectly wholesome one which does not enjoy direct sunlight during some part of the day. But if an apartment must be so situated that it cannot have sunlight, it is some compensation that it have very large windows, so that it may get as much diffused daylight as possible.

Purity of air cannot be maintained in a house unless it be thoroughly dry. Setting aside the not inconsiderable quantity of water produced by our own breathing and by the combustion of gas, oil, and candles, the air in a house is liable to be rendered unwholesome from excess of moisture, 1st, by absorption of water from the rock or soil below, and, 2nd, from the porous stone of which the building is constructed. Not only is the air loaded with moisture from these sources, but it is rendered impure from the exhalations of fungous vegetation or dry-rot, which at the same time destroys the joists and other carpenter work, and seriously affects the stability of the house. It is a mistake to suppose, as many do, that dry-rot attacks only the wood in the basement storey. It is a common occurrence for the ends of joists built into porous stone to become affected by fungous vegetation; and it is frequently seen in pulling down old tenements that the ends of the joist are quite gone, and that, probably, for many years the joists have been resting only on the plaster cornices of the rooms. The remedy is the use of 'shoes' of glazed fire-clay or other material, which are built into the wall, and into which the ends of the joists are placed. The 'shoes' should be somewhat larger than the joists, which should be kept in position by little wedges of wood, so that air can play freely around the end of the joists. Such protected joists will last for hundreds of years, if other circumstances are favourable.

The porosity of most varieties of building stone is remarkable. In the paper to which I have already referred I have given, besides other properties, the quantity of water capable of being absorbed by the stone when air-dried. By weight it ranges from 3·4 per cent. in the celebrated Craigleith stone to 7·2 per cent. in the red sandstone found in Wemyss Bay, on the Firth of Clyde. The significance of this property of porosity is still more readily appreciated if we take the amount of water absorbed by bulk instead of weight. 100 parts by measure of the hardest and best freestone take up about 8 parts of water, and the inferior kind 12 to 15 parts. A cubic foot of the stone will therefore absorb from 5 to 9 lbs. of water, or from half a gallon to nine-tenths of a gallon. The absorption of water by certain kinds of stone is so rapid that in slight showers of rain the whole of the water that falls is imbibed; and although a great part of this evaporates afterwards from the surface of this stone, a portion must always find its way inwards, and this is especially the case when the surface of the stone is kept constantly wet by continued rain.

Another property of freestone is its power of permitting the passage of air or other gas by transpiration and diffusion. A cube of stone varnished over on four sides and enclosed in the other two in an air-tight case provided with inlet and outlet tubes, permits the passage of coal gas to such an extent that the gas can be lighted and will continue to burn, even although the pressure is not more than an inch of water. The same thing applies to other building stones which we, more or less, possess, and to bricks, unless these have been exposed to a temperature high enough to flux the

* Read at the Sixth Congress of the Sanitary Institute, Glasgow, September 1883.

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material of which they are made. The quantity of air diffused into and out of a house by the walls must be very considerable, and as it is a process that is constantly going on, it must necessarily exercise an appreciable influence in maintaining the purity of the air in dwelling-houses. If, however, the stone or brick is saturated with water, the porosity is, for the time being, destroyed; or if there is any air diffused at all it will be loaded with watery vapour, and therefore of less value, in a sanitary point of view, than it would be with only its normal proportion of moisture. Besides this evil there is the more serious one of the water actually reaching the joists and other wood, such as 'dorks' and wall plates and straps, and causing these to decay, and so interfere with the stability of the structure. Coating the stone with oil, paint, silicate of soda solution, or other means of rendering it impervious to water, prevents the absorption of rain; but it also, at the same time, destroys the valuable property of diffusing pure air into and impure air out of the house. The only way that I know of securing the advantages of the porosity of the stone and preventing the injurious action to which I have referred is to have double walls, with a space of a few inches between, into which air is freely admitted by openings in the wall at top and bottom placed in such a manner that rain will not enter them or lodge in them. The opening may be about three inches square, and placed about six feet apart, and they should be sloped upwards for the reason I have just stated. The inner wall may be of brick, either 4½ to 9 inches thick, according to the height of the building, and it should be tied into the outer wall by pieces of thick iron wire with angled ends. The system of building with concrete blocks pursued in Sandown, Ventnor, and other places in the Isle of Wight, is well adapted for constructing walls on the principle I have indicated. The blocks of concrete are about 18 inches wide by 12 inches, and are of two thicknesses, those for the outer wall being 4 or 5 inches, and for the inner about 3 or 3½ inches in thickness, and these are tied together by pieces of iron wire, with a space of about 3 inches between them. This forms what looks, to those accustomed to the 2-feet thick solid walls of Scottish houses, a very flimsy wall, but it appears to be sufficiently strong for a building of two storeys in height, and with a few openings above and below for the admission of air into the space between the outer and inner walls, it would form a structure which, in a sanitary point of view, would be perfect, although I would prefer to have the inner wall of brick, which is more porous than the blocks of concrete, formed of fine gravel and cement, which are used in the Isle of Wight.

It is a common observation that, in spite of every care being taken in the construction of a building, the joints of the stone are often imperfect and admit water freely, especially when the rain is accompanied, as it often is, by high wind, especially when the wind comes from the south-west. To prevent the rain penetrating it is customary in some districts to build, not on a flat bed, but one sloping slightly upwards. This is a system highly to be commended; and if it be objected to on the ground of giving less stability to the building than working upon a perfectly level bed, this objection might be overcome by making the greater part of the bed level, with about two inches of the stone on the exterior side of the wall slightly bevelled.

In the case of rubble walls the best that can be done, probably, is to point them with a mixture of Portland cement with twice its bulk of sand, taking care that the sand is not too fine; and then to whitewash the entire walls with Portland cement, a process which may be repeated with advantage. But the pointing should not be done until the walls have had a summer's sun and are practically dry; otherwise the greater part of the water in the walls will evaporate inwards, that is, into the house, and so keep the atmosphere damp for a longer time than is actually necessary. A two-feet wall will not dry thoroughly, however, even under the most favourable circumstances, in less than two years.

As regards the interior of houses, plaster, whether on brick or lath, is exceedingly porous, and permits of a ready diffusion of gases; and a wall merely whitewashed or coloured with distemper is better in a sanitary point of view than one that is covered with oil paint, which becomes by this process practically impervious to the passage of gases. Wall papers are probably not so bad in this respect as oil paint, but are certainly inferior to distemper or whitewash.

The foundation of a house and the basement are the most important parts of it as regards its sanitary condition. The most perfect foundation upon which a house can be built is a solid platform of concrete, extending over the entire area of the building, and from two to three feet in thickness, according to the height of the walls, and coated over on the top with nearly pure cement. No damp could penetrate this mass; but I would not, even in this case, lay the sleeper joists upon the concrete, but would place them at a sufficient height to obtain ventilation of the space below the floor. In case of accident, arising from the bursting of water-pipes, or other causes, I would make the concrete with a slight upward slope towards the centre of the area, so that water could run away freely through the ventilating gratings. This would be a somewhat expensive foundation, but I think it would be a most satisfactory one. Another system which would probably prove equally good is to build the foundation walls and dwarf walls up to a certain level, fill in the interior spaces with broken material *to the same level*, and cover the whole surface with a layer of Portland cement with two parts coarse and 3 inches thick. Another system still is to place a damp course of slate, or slate stone, bedded in Portland cement, on the whole of the walls; fill up the whole foundation to the same level with broken material, and cover this, but not the walls, with asphalte. This makes excellent foundation, but the filling in is generally omitted, the architect being content with a damp course on the walls just below the sleeper joists, and levelling the interior space and asphalting. In this way I have seen very serious evil resulting from the absorption of water from the soil by the portion of the walls below the damp course, then giving off sufficient watery vapour to keep the space below the floor quite damp and to introduce dry-rot to a most alarming extent. It is a not uncommon practice to neglect the precaution of putting a damp course on dwarf walls, in which case dry-rot is almost certain to occur unless there is profuse ventilation. In such a case the joists should be laid not in a wall-plate of wood, but upon roofing slates placed below each joist, but it is better to place along the top of the dwarf walls a complete anti-damp course of roofing slates bedded in cement, and upon this to lay a wall-plate in the usual manner.

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With regard to the ventilation of the space below the basement floor, it is a safe rule to have gratings all round the building, if it is a detached house, not more than 10 feet apart; but if it is in a street where ventilation can be obtained only in front and back, the gratings should not be more than 5 or 6 feet apart, and should be of ample size, say 10 inches by 6. In order to facilitate the free circulation of air, the dwarf walls and partition walls should have numerous and large openings. It may be objected to that such ample ventilation as I have indicated would make a cold basement storey; but the simple remedy is to put ashes, with or without lime, below the floor, in the same way that deafening is applied to the upper floors.

In a wet climate such as ours, in which it is a not uncommon occurrence to have half an inch of rain falling in a single day, it is a proper thing to cover the chimney-tops in order to prevent rain from coming down and keeping the gable walls to some extent constantly damp, and it is a good thing to combine with the cover a means of preventing down-draught in the chimneys during high winds. The cover which I recommend is one having a flat top with a space below, the whole chimney-top and cover being constructed of galvanised iron. The chimney is 10 inches diameter at the bottom and 8 inches at the top, the cover is 12 inches diameter, and the space between the top of the chimney and the cover is 4 inches. The cover is supported on three iron rods, and is fixed by nuts in the top, which are easily removed when the chimney is to be swept. All chimneys should be lined with fire-brick cylinders very carefully jointed, otherwise a great deal of watery vapour from the combustion of the coal will find its way into the gable walls, and there may be trouble also from smoke. A chimney from a gas stove, unless kept open below, is certain to give trouble from the condensation of water. Every cubic foot of coal gas gives by combustion about an ounce of water; and as gas stoves consume from 10 to 30 cubic feet per hour, a very large quantity of water is produced. In ordinary coal fires the large proportion of heat wasted up the chimney prevents any considerable condensation of water unless when a fire is just lighted; but in the case of gas stoves the heat passing up the chimney is comparatively small, and is probably never sufficient to prevent entirely the condensation of water.

In this brief sketch I have taken up only one branch of my subject, and I do not propose to deal with others, such as the ventilation of dwelling-houses and public buildings; but I shall merely notice, in conclusion, an exceedingly simple means of ventilating apartments, which I have found to give excellent results. It is to put in every window in a house a series of perpendicular holes, one inch in diameter, in the lower frame of the top sash of the windows. The holes may vary in number from three to six, according to the breadth of the window, and I may say that I have not found it necessary, even during the prevalence of the highest wind, or during the coldest weather, to close any of these orifices.

MESSRS. JOHN WRIGHT & Co., of Essex Works, Birmingham, have been awarded a silver medal at the Cornwall Polytechnic Exhibition, and were also noted in the jurors' report as making the best exhibit of gas appliances ever shown in Cornwall.

RIVER POLLUTION.*

By HENRY ROBINSON, M.Inst.C.E.

WHEN the Rivers Pollution Prevention Act was passed in 1876, hopes were entertained that it would result in stopping the pollution of our rivers. If, however, the working of the Act up to the present time is considered, it must be admitted that it is practically inoperative, and the results that have accrued are utterly incommensurate with the evils which had to be grappled with.

I consider that no more fitting time or place could be chosen for discussing the working of this Act than at a Congress of the Sanitary Institute of Great Britain held in Glasgow, a town having deep interests at stake in the matter, whether regarded from a manufacturing and commercial, or from a sanitary point of view. The inquiries that have been held with reference to the state of the River Clyde are evidence of the keen interest that exists. The Reports of Messrs. Bateman and Bazalgette in 1868; the Report on the River Clyde pollution dated 1872–1874; the Report of Sir John Hawkshaw in 1876; the more recent Report by the deputation appointed by the Town Council and Board of Police of Glasgow to inquire into the methods of disposing of sewage adopted in various towns in England; and lastly, though equally deserving of acknowledgement, the valuable data collected by Dr. William Wallace, the City Analyst of Glasgow, all furnish information for the guidance both of those who have to decide as to how this town and this river are to be dealt with, as well as of those who are interested in the general question. The Association for Preserving the Rivers and Lochs of Scotland from pollution rendered good service in forming public opinion and in accelerating legislation.

The Rivers Pollution Prevention Act was passed to meet the well-founded demand for such legislation as would prevent the injury and pollution of rivers by the discharge into them of refuse, putrid solid matter, or other waste or noxious or polluting liquid or solid sewage matter. The Act deals with the evils under three heads—1. Solid matters. 2. Sewage pollution. 3. Manufacturing and mining pollution. The prohibition as to putting solid matters into rivers is absolute. The prohibition as to the discharge of sewage or poisonous noxious polluting liquids from manufactories or mines into rivers, is accompanied by the proviso, that no offence shall be deemed to have been committed where the fluid is conveyed by a channel used, constructed, or in process of construction at the passing of the Act, if the best practicable and available (or reasonably available) means has been used to render harmless the sewage matter or polluting liquids so passing into the river.

Power is given to the Local Government Board to grant further time for a local authority to adopt the best practicable and available means, and to grant certificates where these means have been adopted.

To put into operation this Act a sanitary authority may (the Act, be it observed, is permissive, and not compulsory) take proceedings against an offending mine owner or manufacturer, for discharging liquid pollution or solid refuse, or an aggrieved person may compel a sanitary authority to move in the matter, by application to the Local Government Board. An aggrieved person can also put in motion the Act

* Read at the Sixth Congress of the Sanitary Institute, Glasgow, September 1883.

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against a local authority for discharging sewage into a river. The County Court of the district in which the offence is committed is the tribunal before which the case is taken in the first instance.

In August 1877 (when the Act came into operation) the Local Government Board issued a circular to the sanitary authorities throughout the country, bringing to their notice in very clear terms the provisions of the Act, with the view to their being put into operation.

It cannot be said that this Act was in advance of public opinion, inasmuch as there was a universal agreement as to the necessity for legislation on the subject. Neither can it be said that the Act was too stringent. Indeed, criticism was rather in the direction of its being too lenient, but it would have been undesirable for any legislation to have erred on the side of excessive stringency, as this would have led to its being defied as unreasonable, or to its being disregarded as incapable of being enforced.

Now this Act, mild as its provisions undoubtedly are, has been in operation long enough to enable an opinion to be pronounced as to whether or not it has accomplished, or is likely to accomplish, that which was anticipated. I am of opinion that it has not, and that practically it is a dead letter, and that, unless it is amended, it will remain inoperative. I do not go so far as to say that it has been a useless piece of legislation. It served for a time as a rod to be held over individuals and local authorities who were offenders, and to some small extent it caused inquiry and action where indifference had previously existed. The total effect, however, is inappreciable. The rivers continue, as before, to receive the pollutions which were sought to be abated. Not one certificate has been given to a town that the best practicable method has been employed to remove polluting sewage matter, although there are hundreds of towns offending against the Act which could be prevented from offending by adopting well recognised methods of dealing with their sewage were they stimulated to do so.

Although my own professional experience lies more in the direction of the operations of the Act in regard to sewage pollution, I believe it is a fact that the Act is inoperative in regard to pollution from mining and manufacturing refuse.

The exact amount of good which has resulted will shortly be ascertained when the returns which were moved for by the Duke of Northumberland last session are issued.

As the prevention of the pollution of our rivers was considered (and very properly so) sufficiently important in 1876 to secure special legislation, and as that legislation is not producing the anticipated results, it is most desirable to consider the causes of this failure, and of eliciting opinions with the view of arriving at what alterations are necessary to ensure the attainment of the objects contemplated.

One difficulty which existed at the time this Act was being shaped has disappeared, inasmuch as the methods of dealing with sewage are now well understood, and have ceased to be the bone of contention amongst interested patentees of chemical systems or of enthusiasts who looked to realising fortunes by irrigation. Therefore, in interpreting the expression, 'the best practical and available means,' I am confident that an impartial expert in sewage disposal would now be able to advise without any difficulty as to the proper and suitable system and works for each case.

The interpretation of this important expression might advantageously be explained in any future Act, so as to indicate the standard of purity which will be admissible, and to prevent its being considered that it is intended to require a uniform standard in all cases, which would be both undesirable and impracticable to enforce, as any attempt to compel the adoption of an equally high standard in all cases would lead to failure. It would be unreasonable to require the effluent from sewage disposal works which discharge into a tidal river, or into a river like the Thames, below the water companies' intakes to be as pure as should be required where the effluent passes into a small rivulet, or into a river above intakes of water works.

It appears to me that one serious defect in the Act which has contributed as much as anything else to its being inoperative is this :—The onus of initiating proceedings against offending persons or authorities is largely cast upon the individual riparian, or other, owner, which involves the assumption that such individual is able and willing to undertake the duty of enforcing the Act, or where the sanitary authority is relied on to enforce the Act, it presupposes that it will move in the matter, whereas in regard to sewage pollution, the authority itself is the offender. I may illustrate this by referring to a recent case, which is one of the few that have been tried under this Act, and as I was personally engaged in enforcing the Act against the local board, I am familiar with the facts. The sanitary authority of a town had, in a fitful way and for years, considered whether or no their town should be properly sewered, and the sewage properly disposed of instead of its continuing, as it did, to pollute the beautiful river which passed through the town by discharging sewage matter into it from several old ditches and drains. This state of things would have continued but for the action of a powerful riparian owner who had both the will and the means to fight this board, and who determined to put in motion this Act. He succeeded in these proceedings, and obtained a decision against the authority, which will result eventually in the pollution of the river being stopped.

This was not a very flagrant case, inasmuch as the whole sewage of the town was not passing into the stream. Yet it constitutes one of the very few cases where a riparian owner has moved in the matter.

I think that the burthen of enforcing the Act should not lie with individuals or local authorities alone, as if the question were purely local. It is a public grievance which was sought to be removed by the Act, and requires to be treated in a broader manner than has been done. Individuals taking the initiative (as in the case I have referred to) are placed in a false and invidious position, as their action may prejudice them in the eyes of their neighbours, who may fail to appreciate the motives actuating them. I am quite satisfied that the machinery devised by the Act will continue to be incapable of overcoming its own *vis inertia*.

In my opinion an alteration of the Act is imperatively called for, and I suggest as a necessary change that the initiation of proceedings under the Act should be entrusted (in addition to the authorities and individuals) to public inspectors who should be entirely independent of local authorities, and who should be responsible to a Department of State. These officers should have power to enter premises to examine into cases of pollution, and to report to

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head-quarters. The department, after considering the facts stated in the report, could take action or not. The establishment of such a *modus vivendi* would secure the co-operation of the public, and the existence of causes of pollution would soon be made known voluntarily by residents and others who would be unable or unwilling to enter upon the tedious, costly, and uncertain course of procedure under the Rivers Pollution Prevention Act.

THE DWELLINGS OF THE MIDDLE CLASSES.

THE EVILS ATTACHING TO THE PRESENT SYSTEM OF ERECTING MIDDLE-CLASS HOUSES, AND THE REMEDIES WHICH IT IS NECESSARY TO APPLY IN ORDER TO SECURE THEIR REMOVAL.*

By Henry C. Burdett, F.S.S.

Author of Special Reports on the Dwellings of the Poor in England, Ireland, and America.†

The dwellings of the poor are, alas, still very far from being what they should be. From an actual inspection of these dwellings in various parts of the country, I am compelled to declare with Mr. Fawcett that the first conditions of health, morality, and economy are alike impossible under the circumstances in which a large majority of the poor have to live. The house accommodation of the working classes in our large towns is often so bad as to make it impossible to overstate the evils arising from it; and I have often returned home, after a long day's inspection, possessed with a feeling of wonder that the poor, in the East End of London, for instance, do not rebel in a body, and insist upon being better housed or knowing the reason why. Yet the evil is increasing; for it is revealed in the figures of the last Census that more and more people are crowding into the towns, and less and less are remaining in the rural districts. Thus, whereas in 1861 for every 100 people who resided in the rural districts, there were 165 people living in towns, in 1871 this number had increased to 184, and in 1881 it had reached 199, so it is accurate to say that to-day there are two people living in urban for every one residing in rural districts. This ratio is rapidly increasing, and the evils arising must therefore tend to increase rather than to diminish. Nor is Scotland, or even Glasgow, in a better condition than England in this matter, but rather the reverse. Some will perhaps remember that Mr. John Bright, in his Rectorial Address at Glasgow, said that 41 out of every hundred families in this city live in a single room, and beyond these 41, 37 more out of every 100 live in two rooms. This statement does not convey all the fearful consequences of such a condition of affairs, nor can anyone realise it unless or until they have made themselves acquainted with the proportions and surroundings of such a room as that referred to by Mr. Bright. Many may well ask why, in the face of these appalling facts, do you not take the dwellings of the poor as the subject of your paper, rather than the dwellings of the middle classes? The answer is simple.

Attention has been directed to the former so frequently and forcibly that there is now every prospect of something effectual being done, though the remedy may entail parliamentary action, and something like a social revolution. On the other hand, little has been attempted in the direction of middle-class dwellings, although investigation would prove that masses of the middle classes, though higher in the social scale than the working class, are frequently as badly provided with house accommodation as any class in the community. There is much that demands attention in the dwellings of the middle class, and especially in those of the lower middle classes. The wealthier classes are able to take care of themselves by the employment of such able architects as they may like to select, and the poorer classes—artisans and the like—have thousands of well-arranged and carefully-constructed dwellings erected for them from the designs and under the superintendence of the same class of architects. But the poorer middle class have no such power or means of securing healthy dwellings for their own occupation. To prove this, and to realise the crying nature of the evils attaching to the dwellings of the middle classes, it is necessary to pay a visit to a suburban district under the control of a local board, and to make an inspection of several houses in various stages of erection. These houses will be to let at from 35*l.* to 50*l.* to 75*l.* a year, and possibly at a higher rate still. They will be occupied by bank clerks, commercial, Civil Service clerks, and others.

Such houses are erected by speculating builders, known as 'jerry' builders, are usually mortgaged as the work proceeds, and have no one to look after their construction except the surveyor to the Local Board. He, poor man, often without an apology for assistance, cannot be in every part of his scattered district at the same time, even if he wished to supervise all this class of work efficiently. Besides, it too frequently happens that the jerry builder is a member of the local board himself, or has powerful friends there; and in such cases the surveyor finds it inexpedient to interfere with certain houses, which are consequently the worst of their class. In the model buildings' by-laws, published under the authority of the Local Government Board, nearly every essential for a healthy properly constructed dwelling is provided for, but in many districts, even where the by-laws are in use, they are practically a dead letter, owing to the unwillingness of the sanitary authority to enforce them with uniform energy. Yet the power taken in such by-laws, and which might be brought to bear upon the builders, would render jerry buildings an impossibility, if the local boards were determined to enforce such by-laws without fear or favour. Every local board, that is, the large majority, does not so enforce the by-laws, and is consequently in league with the jerry builder.

We are daily reminded of the power of combination amongst the working classes. Why do not the lower middle class combine in self-defence and crush their present oppressors, the pot-house politician and his ally the jerry builder, who at present too often return and control the members of the local boards, and whose rule is a grinding tyranny accompanied by preventable disease and suffering, not infrequently resulting in premature death?

For the purposes of this paper the writer visited a suburban district, Willesden, where middle-class houses are growing like mushrooms, where the local board have really a good surveyor and a building

* Read at the Congress of the Sanitary Institute, Glasgow, September 1883.

† *Sanitary Record*, vol. v., pp. 273, 275, 305, 307, 321, and 323; vol. vi., p. 277; vol. viii., p. 385 to 389, &c. *Pall Mall Gazette*, Sept. 7 and 26, 1881. *Lancet*, Dec. 9 and 23, 1882.

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inspector, and where houses have been and are being built by speculating builders. These houses offer many points of interest as being at variance with the by-laws now in force in the district.

The houses of these speculative builders are outwardly attractive and comfortable in appearance, and internally the rooms and arrangements are takingly planned. The reason is that directly they are roofed in, and often earlier, they are sold, but within two years they become a misery and a danger to the occupants. Why? Let us examine and inquire on the spot. The builder has several houses on hand in different stages of construction, so every portion of the work can be brought under observation. Here is a grass field, and on a clay soil a house is being commenced. The foundations are being put in; the turf has been removed from the surface of the ground, and a trench is being made, six inches deep and some eighteen inches, or the width of the footings of the house wall, wide. Into this trench they are putting concrete—*i.e.* jerry builders' concrete, made of siftings of dry earth and a little lime. On the top of this concrete the walls of the house will be built, and the joists or supports of the floor boards on the ground floor are consequently placed practically upon the clay soil, or within a few inches of it. If you come to this next house, which is further advanced, you will see that the damp course in the walls, to prevent the damp rising throughout the house, consists of tarred felt, a material which will be quite useless for its purpose in a few months' time. It is cheap, however, and keeps out the damp long enough to enable the builder to sell the house. Now look at the mortar of which the house is built. It is even worse than the concrete, being made of rubbish—*i.e.* of lime and burnt clay siftings, or in large part of clay pure and simple. By facing up and pointing the brickwork this jerry work is effectually hidden. After a brief interval, however, the appearance this outwardly beautiful piece of brickwork will present can be seen by looking at that house over there, where large cracks and bulging walls speak eloquently.

Here is a house, empty, which was completed and occupied two years ago. Notice how the inside is finished, to take the eye: good mantel-pieces, showy grates, and attractive papers. Now look at the floors. Not one of them is level; they are at all sorts of angles, owing to the sinking of the walls. You have to walk up and down hill, as it were, to cross each room in the house. Notice how the damp has risen, even to the second-floor rooms, and in all the water has come through the roof, not in one, but in many places. The bath-room and w.c. are conspicuous, but only to the practised eye, by reason of the scamped plumbing and forbidden fittings used. Look at the exterior. The footings of the chimneys are above the ground level, the garden walls are all bulging out, the piers cracking and coming to pieces; and, if left to themselves much longer, they will fall down. Observe how the roof sags, owing to the scantlings of the rafters being insufficient; and in case of fire, though a detached house, it is so close to the next, that the fire must spread because the usual protection against fires spreading from one house to the next is absent, no parapet being carried up on the external side walls. Built on clay, containing, practically, no cellars and no damp course, it is literally placed flat on the ground. Notice that the floor-level of the house is now below the level of the garden: and on this fine summer's day the dampness is shown many feet up the walls of the house.

As to sanitary arrangements these houses over there have a cesspool in their front garden within twenty feet of the front door, which overflows through the front garden wall and under the foot-path into the street gutter, as you will observe. Look at the soil-pipes! One lead one there has no less than six angles, and is tapped at the top by a half-inch pipe ventilator, and one is carried up the chimney and turned over at an acute angle into the chimney itself. In more than one instance the soil-pipes are leaking on to or down the sides of the houses. See again, this house has had to be under-pinned within two years of its erection and since it was purchased from the builder.

Finally observe that as you walk through the district many of the houses are worse than those we have been examining, that the rentals vary from 35*l.* to 75*l.* per annum, that new roads occupied for two years present the appearance of sloughs of despond, because the Local Board declines to take them over, but that nearly every house is occupied, and that many are sold before completion.

Now observe what the by-laws of the Willesden Local Board, with respect to new streets and buildings passed in 1881, provide. The whole ground surface or site of a house must be properly asphalted and covered with a layer of good cement concrete, rammed solid at least six inches thick. The building must be solidly put together (1) with good mortar, compounded of one part of good lime, and of three parts of clean sand or other suitable material, or (2) with good cement, or (3) with good cement mixed with clean sharp sand. Every wall shall have a proper damp course of sheet lead, asphalte or slates laid in cement, or other durable material impervious to moisture, beneath the level of the lowest timbers, and at a height of not less than six inches above the surface of the ground adjoining such wall. All footings shall rest upon some solid and sufficient substructure as a foundation, or not less than nine inches of good concrete. Every party wall shall be at least nine inches in thickness, and carried up for a height of at least fifteen inches above the roof, flat, or gutter of the highest adjoining building. Every soil-pipe shall be at least four inches in diameter, shall be outside the building, and be continued up without diminution of its diameter, and without any needless bend or angle being formed in such soil-pipe. Every cesspool shall be at least fifty feet from a dwelling-house, the brickwork shall be in cement, and shall be made watertight, with a backing of at least nine inches of well puddled clay around and beneath such brickwork.

Many other provisions might be quoted, but enough has been said to prove that in some cases, at any rate, if not throughout the district of Willesden, the builders set these regulations at defiance, and wholly and openly disregard them.

It must not be supposed, however, that in naming Willesden I do so because it is especially bad. Far from this being the case, I wish it to be understood that in some respects Willesden is far better managed than certain other localities. Indeed, I had intended to incorporate in this paper instances showing the condition of middle-class dwellings at Stamford Hill, Brixton, and elsewhere. There the jerry builder flourishes to an extent hardly credible; and if—as in an instance which came under my own notice—the individual occupant of the jerry-built house tries, of

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his own strength, to obtain redress and a healthy dwelling, he is defied by the builder, aided ineffectually by the officers of the local authority, forced ultimately to attend the police-court on five separate days, owing to continual adjournments, left for weeks with an open foul-smelling drain in the middle of his kitchen floor, which causes general illness to the inmates of his house, and is finally forced by his despair to execute the necessary alterations at his own expense. Is not the condition of the occupant of a middle-class dwelling as much entitled to sympathy and succour as the class below him?

What, then, are the remedies? First and foremost, that householders shall combine and form themselves into a local association which shall defend them from the cruel wrongs they now have to endure. A very small subscription, probably 5*s.* a year, to such an organisation would suffice. The first step for such an association to take is to select and secure the election of suitable men on the Local Board; then its funds could be utilised to prosecute offending builders, and to secure the detection of any breach of the by-laws. In this way, and by the exercise of a little public spirit on the part of the classes interested in these matters, an effectual stop would soon be put to the existing evils, and the jerry builders' lot would cease to be a happy one. Under such a system the local sanitary authorities, which now so often neglect their duties (statutory and implied) would commence a course of action which would possibly warrant their possessing greater powers.

Extended legislation on one or two points would then be justifiable. No builder who was engaged in the erection of buildings within a district controlled by a local board should be eligible as a member of such board. By-laws would be enacted as to the height of rooms, as to hearths (the hearth, being part of a floor, cannot at present be dealt with by by-laws), and as to the materials used to plaster the interior of houses, which is at present frequently kept in its place by successive coats of papering. All these latter items, and others of more or less importance, might be dealt with if the 157th section of the Public Health Act of 1875 were amended by allowing sanitary authorities to make by-laws '*with respect to new* buildings,' and leave the Local Government Board as the confirming body to determine whether any proposed building regulations were reasonable or not. In this way every part of a new building could be dealt with as far as by-laws can secure this end. The Local Government Board should possess full power of control because they are answerable to the House of Commons and to the country, and if they are not well advised in any technical matters they can get more competent professional officers.

Local governing bodies should be liable to some sort of punishment if they are shown to fail seriously in their duties. In support of this I may quote the district of Bangor, where last year the water supply was poisoned by specific disease, and caused a fearful epidemic (upwards of 550 cases and about fifty deaths), which, apart from the amount of personal misery and anxiety experienced by the relatives of those attacked, caused a money loss to the town which has been estimated at between 50,000*l.* and 60,000*l.* The splendid Penrhyn Arms Hotel there, was for many weeks, in the season, without a single visitor, and trade was almost at a standstill. Such a condition is surely one which ought to bring about some such punishment as corresponds with disfranchisement in corrupt boroughs. Instead of this, it has been decided to elevate the Local Board of Bangor to be a Corporation.

As regards the Acts now regulating building matters, there are in London the Metropolitan Buildings Act, 1855, but this Act, apart from certain regulations as to duties, &c., of adjoining owners, &c., deals almost exclusively with securing stability and the prevention of fires, health matters being, as may be implied from the date, almost entirely lost sight of. A recent Amendment Act, 1879, enables the Metropolitan Board of Works to make by-laws as to, amongst others matters, foundations and materials for walls. But these are not all important matters, and when it is borne in mind that the Metropolitan Board of Works has no medical adviser, and that the by-laws it makes have to be confirmed, not by the Local Government Board but by the Home Secretary, who also has no medical department, is it surprising that sanitary matters do not form an important part of the Building Acts? In London the vestries, acting under the old Metropolis Local Management Act, 1855, have control over drains of houses, and this might be sufficient if it were effectually and uniformly applied through competent officers. But vestry surveyors are not ordinarily a very well-informed class of men, and as the Act merely says, everything is to be either 'sufficient' or 'to the satisfaction of the vestry,' and does not prescribe definitely what is to be required, it is of little real use.

In the provinces, except where there is a local building Act, *i.e.* where the authority is above being advised by the Local Government Board, and is rich enough to get special Parliamentary powers, they obtain by-laws under the 157th section of the Public Health Act, 1875. These may be made by any urban authority and, with the consent of the Local Government Board, by any rural sanitary authority also. In the latter case it is usual for the by-laws to be applied to certain parts of the rural sanitary district—parts which are not sufficiently populated to be formed into urban self-governed districts, but in which there is more than ordinary building going on or about to go on. It is, I think, matter for consideration whether the time has not already arrived for making most of the ordinary building regulations applicable by Act of Parliament to all new buildings wherever situated.

A house in the most rural district, miles away from any other house, ought to be built with strict regard for reasonable stability, for health, and for safety from fire. For an owner of a house, if he may burn his own property, ought not to be allowed to burn, or even to frighten his servants, his visitors, his assistants, or even his relations. Neither ought he to injure or kill them by an insecure or unwholesome building. The necessity for making efficient separation between houses to prevent the spread of fire was shown at Margate some time since.* A fire occurred in Cecil Square in that town, where the Assembly Rooms took fire, which spread to a number of adjoining houses. The whole of the south side of the square, including a ladies' school, was burnt out, and, although no one was killed, all were terribly frightened and inconvenienced, and

* Oct. 28, 1882.

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probably the business of several was more or less ruined.

At present urban authorities may, but are not obliged to, make building by-laws; and, if they make them, they need not enforce them. Rural authorities can get power to make building by-laws, but often do not trouble to do so. Hence, in lots of places, houses are being built under no local supervision whatever. Hastings and St. Leonard's may be mentioned as instances of this. The urban district is, I believe, only about half a mile deep from the sea, and three or four miles long. This area has building regulations, but outside the urban district, to the north, many new houses are, I believe, being built in the rural districts under no control at all, other than that of the owners and builders concerned. At any rate, I am informed that the Hastings Board of Guardians, as the rural sanitary authority, have no building by-laws.

Such is permissive legislation, and when we send our children and families to the seaside to take in a stock of health and strength for the winter, we are often compelled, unwittingly no doubt, but none the less certainly, to house them where the most important principles of sanitation are neglected.

Such are some of the remedies needed and recommended. In considering them and this question of the dwellings of the middle classes, we have necessarily been brought face to face with serious evils, which nearly affect ourselves. It is to be hoped, with the aid of the Press and the discussion which will, I hope, follow the reading of this paper, that an adequate and permanent remedy may be found and applied.

DEPOPULATION IN FRANCE.—Dr. Lagneau, in a paper read before the Académie des Sciences, shows how there are certain departments in France in which there is always a tendency more or less to a diminishing population. In 1841 there were 13 of these, in 1846 there were five, in 1856 there were 54, in 1872 there were 72, in 1876 the number diminished to 20, while in 1881 it rose again to 34. Twenty-six departments possessed in 1836 a population of 9,187,636, which in 1881 had decreased to 8,539,384. Out of these 26, seven—viz., Eure, Lot-et-Garonne, Calvados, Gers, Orne, Tarn-et-Garonne, and Basses-Alpes—owe most of their decrease to the excess of deaths over births, though this cause varies much in force, the annual excess of deaths in Eure being 313 in every 100,000 inhabitants; in Basses-Alpes the excess is only 18 in the 100,000. In the greater number of cases emigration appears to be the cause of decline. In Haute-Saone, Ariège, and Cantal a fourth of the population has emigrated in the last 43 years, or, in other words, from 545 to 599 out of every 100,000. But, on the other hand, those departments have experienced an excess of births over deaths, so that the real loss by emigration has been reduced from 306 to 170 in the 100,000. In Eure and Calvados, which present a remarkable excess of deaths over births, emigration is only at the rate of from 17 to 37 in the 100,000. Dr. Lagneau attributes the feebleness of natality and the mortality in the departments of Normandy and the Garonne Basin greatly to the herding together in the cities and towns, and there is a strong contrast between the vital statistics of their inhabitants and those of emigrants to the colonies, where the conditions and results of natality are much more favourable.

THE death-rate of the borough of Gateshead for the four weeks ending Sept. 22 exhibited an average of 24·5 in the 1,000, showing an increase of 4 in the 1,000 to the corresponding number of last year, which some members of the Council attribute to the deficiencies of the ashpit system.

SOUTHPORT.

AN ILLUSTRATION OF THE DANGER WHICH THREATENS THE EXISTENCE OF A HEALTH RESORT.*

By ARTHUR H. WRIGHT, M.D.

I HAVE been led to believe that some of the dangers which are very apt to threaten the well-being of a growing health resort, might be fitly considered on this occasion.

A health resort I define to myself as a place possessed of such natural hygienic advantages, that the workers in the hives of modern industrial life, and the sick and the invalid are drawn to it—the first to secure for themselves and their families healthy homes away from the great centres of industry; the others bearing the burden of hereditary disease, or overdone in the battle of life, come to it; to recover it may be health and vigour amid sanitary conditions best fitted to promote recovery from temporary illness, or to render life more endurable in circumstances of chronic ill-health. So thinking, I am justified in advancing the proposition that any sin against the laws of hygiene in a health resort inflict injury, not only on its inhabitants, but also injury, it may be deadly injury, on the numbers of those whose welfare depends upon the preservation for them, unimpaired of these conditions of healthy living, which have in health resorts been provided for their use. I think it is not a bad plan in considering any subject to select a special instance illustrating it, and, by dealing with the special instance, establish an example for imitation and avoidance.

I shall, acting on this belief, take the town of Southport, in Lancashire, a health resort which, with its suburb of Birkdale, has, during the last fifty years, risen from a fishing village planted in the midst of Sand Drives to a town of 43,700 inhabitants. Southport and Birkdale are, however, two distinct places: Southport is a borough, Birkdale is under a local board. It is with Southport borough we have to do—a borough, I believe, with the high rateable value of 200,382*l.*; in the census, 1881, population of 32,191.

I shall, in the following, shortly describe the position which Southport, during her fifty years of life, has attained in this part of the county where she has grown, the reasons which have qualified her for taking that position, and the dangers which now threaten her prolonged prosperity. And I shall ask you to remember that what I describe as the dangers which threaten Southport are also dangers which threaten all towns of like pretension and like circumstances. Southport owes her rapid growth and favour with which, until recently, she has been regarded, to the possession of great natural advantages. Men of business from Liverpool, Manchester, and all surrounding Lancashire manufacturing towns, have, when their positions in the world have been secured, flocked to Southport, that they might in it establish houses where their hours of leisure might be passed, their families live, and their children be reared, amid the conditions necessary to a healthy life.

Invalids have frequented the town in numbers because they find its remarkably equable and dry

* Paper read September 26, 1883, at the Congress of the Institute held at Glasgow.

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climate, its flat surfaces, and its thorough ventilation by south and west winds, were favourable to the re-establishment of health. Southport has grown as the home of well-to-do people, and as a worthy sanitorium for the North of England. I believe that very fairly have many of the indications of a correct sanitation been carried out; but in one very important particular the municipal authority of the town have failed; they have failed to provide the town with a satisfactory system of drainage, and, I fear, have failed to appreciate the requirements of Southport in this important particular.

I have stated that Southport possesses great natural advantages; but I again urge the expression of my belief that these are in process of being altogether nullified by an unsatisfactory drainage. Allow me to adduce facts in support of these allegations.

Southport is situated on the Sand Drives, nearly midway between the estuaries of the Mersey and the Ribble, on the seaward margin of an immense open tract of flat country. A section of the soil, a mile and a half inland from the sea beach, would give peat superimposed on clay land, as the sea is approached gradually. The peat is overlaid with a layer of blown sand of thickness varying according to the inequalities of the sand-drift. By degrees the peat layer thins out, and under the greater part of the town wings give blown sands superimposed on clay and marl.

The Southport of to-day is a very wealthy town, especially laid out as a health resort, possessed of ample air spaces. The proportion of nine persons to an acre is out of all count below the proportion for towns of like size, so that none of the ill effects of overcrowding can possibly be operative here. The town is so situated that her wide streets are constantly ventilated by south and west winds. The climate is very remarkable for its equableness. Although the rainfall is very slightly in excess of the average, the porous nature of her soil makes it such that moisture at once disappears, leaving the surface dry. These conditions would, *à priori*, render it likely that Southport would be a favourable place for the treatment of various diseases, which the experience of the past has proved that it *has* been, and that it should be a healthy residence. The experience of Southport's present condition does not bear out this reasonable expectation. Numerous complaints of residents, fortified by the mortality statistics of the town, prove that the salubrity of the climate of Southport and its health standard have not, for years past, and are not now, what the salubrity and health standard should be. I would, in the remainder of this paper, demonstrate the causes of this evil state of matters, which I believe to be entirely remediable.

A new drainage scheme was designed for Southport by Mr. Mansergh, C.E., and was opened in 1878. The gradients obtainable in Southport vary from 1-1,500 to 1-5,000 feet, and the outfall is 4½ miles from the town. I do not wish to enter into a detailed account of this system; but I would remark that its principal feature is the smallness of the gradients and consequent slow rate of the sewage stream. The whole system is tide-locked twice in twenty-four hours. The ventilation of the sewers is effected by grids opening at short intervals in the streets. Through these grids large quantities of sewer-gas pass, and make their presence known by very disagreeable smells in the streets, and even houses of the town, which they enter through the windows. An attempt has been made to increase the ventilating surface provided for this drainage system by the erection of ventilating pipes at the sides of houses. This is, I think, a method of very questionable advisability, as cases have been known of illness caused by sewer-gas sucked from the ventilators down the chimneys of houses to which they were attached. In the belief of the inhabitants, which I hold to be well founded, these drainage emanations are the causes of numerous disorders of health, of head-ache, sickness, depression, and so on. The universal existence of these smells is substantiated by memorials, numerously signed by inhabitants, from all parts of the town, and has been publicly admitted by the Corporation of the town and by Major Tulloch, R.E., inspector of the Local Government Board, who at a recent inquiry at Southport held it unnecessary to call witnesses to prove an admitted fact. Such an admission carries with it a great deal. I infer not only that very frequently, and more especially at certain states of the weather and tide, very large quantities of sewer-gas pass out of the drain, and make their presence known by keen smells, but that at all times the atmosphere of the town is tainted with sewer emanations, because sewer-gas may be present, and do harm to health, though its quantity is inappreciable to the sense of smell, and because certain sewer-gases are inodorous. The conditions in such a drainage system are always present for the formation of noxious gases and their discharge.

The reputation of Southport has, since the opening of the drainage system, widely suffered in consequence of the smells, and certainly the value of house property, and the demand for lodgings has, for the last five years, been lessened. In so far thus it has been established that Southport is not what it ought to be as a health resort, because the inhabitants and visitors are disgusted, and believe they are made ill by drainage smells in its streets. And I believe medical opinion will support the belief that not only do sewer-gas emanations cause special forms of diseases, sometimes of the worst kind, but even when not acting with such virulence as to cause distinct illness, a sewer-tainted atmosphere lowers the general tone of vitality, and tends to embarrass recovery from all forms of disease. If this statement be true, certainly the admission that sewer-gas is largely present in the air of a health resort is a very serious admission, and will go far to tend to destroy its reputation as a health resort.

For some years past, Southport has suffered from her prosperity; built rapidly on a site which, with its intrinsic advantages also, was in its nature subject to certain dangers, adequate provision had not been made for her drainage as the number of houses increased, and when, in 1877-78, the present system of drainage was devised, the great flatness of her site entailed sewering difficulties which I think I am justified in describing as insurmountable in the *then* state of sanitary engineering science. The cost of overcoming these difficulties would have been so great that Mr. Mansergh himself stated that the revenues of Lancashire would not pay for those pumping arrangements which alone could be hoped to remedy the difficulty. I have spoken of the town before the inauguration of the new drainage, and then described the difficulties attending it, because I wish, by adducing mortality statistics for both terms, to show that the widespread belief that the

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sanitation of Southport has not been improved by the present system of drainage is well founded. I shall very shortly speak of the mortality statistics of Southport before and after 1878, the year of the inauguration of her present system of drainage.

The position I now wish to establish is, that the mortality statistics of Southport show that her standard of health has not been, and is not now, what the health of a professed health resort should be, and that the present system of sewerage inaugurated in 1878 has not materially improved the standard.

There is in the Registrar-General's reports a table which gives the gross death-rates of fifty large town districts. Now these large town districts have large mixed populations, numbering, on an average, 50,000 persons; and these towns have been built through many years with no special reference to sanitary requirements; and they have no pretensions to be considered health resorts. They, in fact, represent the kind of place from which people in feeble health come in search of the more perfect sanitation, which a health resort should afford. On comparing the death-rates of these places with the rates of Southport I find that for the term 1876–1878, on an average, every year, out of fifty, thirty-five such places had an average death-rate of 20·1, as compared with 23·3 for Southport, and their average population was 55,126, as compared with 27,148 for Southport. For the term subsequent to the new drainage 1879 to 1882 19·1 of these towns had a death-rate of 17·6, as compared with 19·4 of Southport. So many of these places had a death-rate, absolutely less than that of Southport, but besides these, many had a death-rate very slightly above that of Southport for these years.

I think, taking into consideration the larger population of these places, and the conditions of life in them, a comparison of their death-rates with that of Southport tells strongly in support of the assertion that Southport did not before 1878, and does not at present, merit the reputation of a health resort in relation to them.

Nor do the death-rates of Southport range for the terms 1876–78, 1879–82 on a level with the rates of other health resorts. Thus I some time ago addressed a circular to the medical officers of all watering-places mentioned in the Registrar-General's second quarterly return for each year. I received information more or less perfect from nineteen of these. On comparing the average of these death-rates they were all considerably less than the corresponding rates for Southport. I specially quote the rates for the second term 1879–82 after the opening of the new drainage: Average population of twelve watering-places 20,387, average death-rate 17·1; average population of Southport 32,191, average death-rate 19·4. Lest it be said that the smaller populations of the health resorts accounted for their smaller death-rates, I quote the following: 1879 to 1882, Hastings and St. Leonards, population 42,256, death-rate 16·7; Torquay, population 24,765, death-rate 15·8; Cheltenham, population 46,844, death-rate 17·5; Scarborough, population 30,484, death-rate 18·7; average death-rate of these four watering-places, 17·1. Since these statistics were calculated by me, the Holiday number of the *London Medical Record* of July 15, 1883, has published statistics which enable me to compare the gross death-rate of twelve more watering-places for the term 1879 and 1882. Their average gross rate equals 15·1, as against Southport 19·4. The standard of health of Southport, as shown by these death-rates, was considerably below the average standard of English health resorts.

I would now adduce some facts to show that the new system of drainage has not improved the health of Southport. Had it done so, we might have expected to find a marked fall in the death-rate of the town after its inauguration. The new system came into full operation at the end of 1878. The death-rates for 1877-78 are 22·8, 22·8. The death-rates for 1879-80 are 20·8, 22·9. The average of two years after the drainage year gives a drop of 1·0, a small improvement indeed, and even this is explained on the plea of a drop in the general death-rate of the country. The same calculation gives a drop of ·8 in the England and Wales rates, and a drop of ·7 in the average death-rates of all the fifty large town districts. There are other parts I should like to enter upon, but time and, I fear, your patience both forbid a too long discussion. I should like only to say that, though in 1881–82 the death-rate of Southport dropped, its drop took place, to a great extent, in the death-rate list of infants, and was consistent with a very marked drop in the birth-rates.

I now inquire what light a consideration of the death-rates of the drainage diseases, par excellence, *typhoid fever, diphtheria, scarlatina*, throw upon the question of benefit or no benefit to Southport since the new drainage system. I find as follows:—

Typhoid fever in 1879 a drop of ·43 indeed occurred, but then I also find that in 1877 a drop of ·78 occurred, which could not be due to the new drainage, which was not then laid. I do not, therefore, see why the drop in 1879 should be attributed to its good effects, and not to the unknown influences which produced the drop in 1877. And although the death-rate dropped in 1879 it has since shown a steady tendency to rise, as the new drainage might be supposed to make its influence felt, following the sequence for 1880, 1881–82, of ·22, ·31, ·17, and for the first half of 1883 ·28. And this is the more significant because the corresponding rates for England and Wales have been ·26, ·18, ·20, giving an average for the term of ·21 against ·23 of Southport; while for the first half of 1883 England and Wales gave a typhoid fever rate of ·19 as against ·28 Southport.

The diphtheria death-rate gives still more unfavourable testimony as to the effects of the new drainage. For the years 1879, 1880, 1881, 1882, the rates are ·06, ·09, ·18, ·20: it has steadily risen. And though it dropped in 1879, still that cannot be attributed to the beneficent influence of the new drainage, because in 1873, 1874–75, 1876, the sequence was ·00, ·00, ·04, and ·18, before the drainage was laid. And also the average death-rate for England and Wales for the term of 1879–82 equalled ·11, Southport ·13. The scarlatina death-rate also gives unfavourable testimony as to the effects of the new drainage. Formerly there was little or no scarlatina in Southport, and since 1877 it has been markedly present and has steadily increased:—

1876	1877	1878	1879	1880	1881	1882
·00	·07	·51	·16	·12	·34	·44

In 1882 the Southport scarlatina rate, ·44, nearly equalled the England and Wales rate, ·51.

I cannot compare the fluctuations of these death-rates as they occurred for the above term in large town districts. I cannot gain the data as far as my search has gone. I content myself with giving a summary of the number of deaths which on an average occurred in the health resorts, quoted by me in

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my pamphlet on the sanitary condition of Southport and in Southport for the term 1879–1882 :—

	Health resort.	Southport.
Typhoid fever.....	14	25
Diphtheria	3·2	18
Scarlatina	12	35
	29·2	78

I think that, as far as the death-rate of typhoid fever, diphtheria, and scarlatina, the sewerage diseases *par excellence* show that certainly the new drainage system of Southport cannot be said to have improved its standard of health, and its establishment certainly has not been followed by such a marked improvement in these mortality returns as to place Southport on a par with other health resorts, or to justify the allegations that its health standard is what the health standard of a health resort should be.

And in conclusion I would submit that these mortality statistics I have given, whether they represent the gross death-rate or the rate of special diseases, establish the same assertion—*i.e.* they do not present any proof that the new drainage system has benefited the town, but they indicate a contrary conclusion.

There is another danger which partly threatens the sanitary condition of Southport and its reputation as a health resort—that in the high level and impure condition of its subsoil water. On an average the subsoil water-level in Southport is 3½ feet to 4 feet below the surface ; and to my own knowledge at certain times it renders quite wet and even stands in the cellars of houses in various parts of the town. Ten specimens from various parts of the town and from the cellars of houses have been analysed by Mr. A. Linethan, F.C.S., and on a consideration of the total results obtained he pronounces the subsoil water to be so contaminated with sewage matter as to be dangerous to the health of the inhabitants ; certainly a complete drainage scheme for Southport ought to make provision for lowering the level of its subsoil water.

I would venture to submit that in the foregoing remarks I have established that the town of Southport naturally possesses sanitary advantages, which would entitle her to take place as the leading sanitarium of the North of England, as especially of the great mercantile and manufacturing towns of Lancashire and Yorkshire. I have established that a great danger threatens and has threatened her qualifications as a health resort in the difficulty of draining her site, and in the inadequate system of drainage now laid down, which does not and cannot in the nature of that site, quickly, safely, and inodorously convey the sewage away from the town, and does not deal with the very important matter of lowering the high level to impure subsoil water. I would close these remarks by stating my belief that Mr. Isaac Shone's system of pneumatic drainage would solve the drainage difficulty at Southport and places labouring under the like disadvantages of flatness of site ; in doing so it would relieve her of her one great sanitary disability, and would set her free to rise to her natural place as leading sanitarium of the North of England.

THE Gas Light and Coke Company and the South Metropolitan Gas Company have each sent a contribution of 100*l.* to the funds of the National Smoke Abatement Institution

ON THE ADVANTAGES OF LOW CEILINGS IN SMALL HOUSES.*

By JOHN HONEYMAN.

THE height of the ceiling affects both the owner and the occupier of a dwelling, but chiefly the occupier; for whereas it affects the owner's pocket only, it affects both the pocket, the comfort, and the health of the occupier. If the owner is perfectly free, he will simply adopt the height of ceiling which he thinks will enable him to get the largest return from his property. It by no means follows that he will adopt a low pitch. He may think that high ceilings will make his houses more attractive ; in certain circumstances yielding higher rents, or at least securing a better command or a better class of tenants. But if the ground he builds upon is dear, and the demand for houses great, he will be tempted to make the storeys low and increase their number ; and in so doing he will be doing what is at once best for himself, and also—unless he make the rooms small as well as low—what is best for the community.

But in most of our large towns and populous places a person about to build is not free. He must build in conformity with regulations limiting the total height of his building, and prescribing, among other things, the height of ceilings and the cubic capacity of rooms. Hampered by such restrictions he cannot suit his houses to the requirements of the districts where they are wanted ; he must make them as Parliament has been pleased to prescribe, however extravagant or unsuitable for the people who require them, and he must get a profitable return for his expenditure from these very people who don't wish extravagance, and can't afford to pay for it, but who in the circumstances either must pay for it or do without dwellings. For example, if the Police Bill drafted by the Corporation of Glasgow became law, a man having land bounded by a new street forty feet wide would not be allowed to erect a tenement of dwellings in that street more than two storeys high, with this necessary result—that his return for the cost of land and buildings must be got from two tenants instead of from four or six. If left to his own discretion he would, at a small additional outlay, make his buildings, say, four storeys high, and—profitably to himself—accommodate on the same ground twice the number of tenants at lower rents. Now, assuming in the meantime that the four houses erected in this way were as good as the two made in conformity with the Police Bill, it must be perfectly obvious that, whether the owner made more out of the transactions or not, the erection of the four would be distinctly most advantageous for the tenants, and therefore for the community at large ; because in this way twice the number of people would get accommodation where they want it—not where the Corporation say they ought to want it—and they would get it at a greatly reduced rent, both, I submit, considerations of the very greatest importance, and having a direct bearing on sanitary questions of great interest. Of course, if it could be proved that high ceilings and low tenements were essential to secure healthy conditions, a great deal could be said in favour of compulsory sanitation in that direction, although even in that case I should be prepared to say a great deal against it ; but it has been abundantly proved—and this was very clearly

* Read at the Sixth Congress of the Sanitary Institute, Glasgow, September 1883.

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brought out at the Newcastle Congress—that there is no necessary connection between density of population and a high death-rate; and, I may say, that the very same statistics—namely, those of the various improved dwellings' companies—which most conclusively prove this, as conclusively show that there is quite as little connection between low ceilings and a high death-rate; as in all these dwellings the ceilings are low and the storeys numerous. Most people, however, in this part of the country at all events, I may venture to say most sanitarians, still cling to the idea that—*ceteris paribus*—a room with a high ceiling is a more healthy dwelling than one with a low ceiling. Now, I wish to strike at the root of this prejudice which as affecting legislation has had and may—unless eradicated—still have most pernicious results; and I hope to be able to prove that, other things being equal,—that is, that, given two rooms of different heights but of the same capacity, having the same size of chimney opening, the same area of window, door, and vent openings, the lowest will be the cheaper, the more commodious, the more comfortable, and the healthier dwelling of the two.

I shall dwell chiefly on the sanitary aspect of the question, merely devoting a sentence or two to the other important points I have mentioned. One of these, the greater extent of floor area in a low than in a high room of the same capacity, is self-evident, and the advantage of this to the occupant is equally obvious. The economy of the low pitch is not quite so readily understood. For the sake of illustration, I have calculated the rents which must be charged for houses of 2,000 feet capacity in order to yield 5 per cent., arranged in three different ways—first, in tenements of two storeys of ten feet; second, in tenements of three storeys of eight feet; and, third, in tenements of four storeys of eight feet; allowing a proportionate area of vacant ground in each case; and I find that in the first of these—the two-storey tenement—the rent would require to be 9*l.* 6*s.*, in the three-storey tenement it would be 8*l.* 5*s.*, and in the four-storey tenement, 7*l.* 14*s.*; so that the artisan contented with an eight feet ceiling, might have a roomier house for 7*l.* 14*s.* than he can possibly get for less than 9*l.* 6*s.*, where restrictions already referred to exist. In other words, he is compelled to pay 2*l.* 8*s.* per annum, or fully a third more than might otherwise be required, and at the same time he must be content to occupy a smaller house in a less convenient locality, without one solitary compensating benefit, merely because some sanitarians, chiefly municipal, think such treatment good for him. To my mind it is unmitigatedly bad, and a very serious matter for our working classes. For observe, it is impossible to take this 2*l.* 8*s.* out of the owner's pocket, the tenant must pay every penny of it, as, of course, no builder in his senses is going to put up dwellings which will not yield him 5 per cent. at least.

But the important question remains—would the low house be healthy as well as cheap and roomy? In my opinion it would, and in a greater degree than the high house. The means of ventilation, which alone are admissible in such dwellings, being of the simplest possible kind, it will be found that it is easier to ventilate a low room than a high one by their agency. Practically, the ventilation must be effected by the admission of fresh air by doors and windows—or round these when closed—through the badly fitting joints of floors and skirting boards, or by special inlets not intolerable to the inmates (if such can be devised) and the extraction of air by the chimney. Such means have been found sufficient, except where apartments are overcrowded, that is, except where the chimney is insufficient as an extractor. We may take it that in any room having a door, a window, and an open fireplace, three or four people may sleep safely, and the condition of the air will depend not so much on the capacity of the room as on the area and draught of the chimney. Those who are familiar with the subject will, I trust, excuse me if I say for the information of others in this mixed audience, that even such a capacity as is prescribed in our Police Bill—400 cubic feet to each adult—is utterly insufficient unless we have along with that a constant and rapid change of air. But to effect this change so that the whole volume shall be kept up to a safe standard of purity, it is necessary that the fresh air should be properly distributed and permeate the whole apartment. This point, I fear, is sometimes lost sight of. For example, if we take a room of 2,000 cubic feet with five inmates, to keep the air, not as pure as we could wish, but in a tolerably healthy condition, at least 5,000 cubic feet of fresh air would require to be passed through the room per hour; and, as an ordinary open fire will easily extract that quantity, there seems to be no great difficulty about it. But, observe, it is quite possible to pass all that quantity through the room without purifying the atmosphere in any appreciable degree; we may let it all in at one side of the room and up the chimney at the other, leaving the air breathed by the inmates impure and poisonous, perhaps fatally so; the more complete the distribution of the fresh air, the more beneficial will the ventilation be. Now the facility of distribution will depend to a large extent on the form of the room. If the room (always bearing in mind that we are speaking of rooms of the same cubic capacity) be high in proportion to its area, and the fresh air be admitted in the usual way referred to, the lower part only will be ventilated, and a large proportion of its atmosphere will remain impure; whereas if it be low in proportion to its area, it will all be well ventilated, and the inmates will get the full benefit of the room's capacity. In the other case they would not, as a considerable proportion of the high room would remain stagnant and foul, a condition objectionable on other grounds.

But, it may perhaps be said, granting that the air in the upper part of the room, say a fourth of the total volume, remains unaffected, and that the 5,000 feet per hour allowance is distributed in the lower part only, is that not exactly where the fresh air is wanted? Certainly, but fresh air is not *the only thing* that is wanted in an artisan's house. Warmth and freedom from draughts are only second in importance—if, indeed, they are second. There are delicate women and tender babes to be considered, as well as robust men, and our mortality tables painfully remind us of the fact that that consideration is far too much overlooked. No doubt by the passage of a given quantity of air through a room you can make a part fresher than the whole, but it is evident that as you reduce the part affected you necessarily increase the velocity and lower the temperature of the current; indeed, you can without difficulty carry this reduction so far that, with the aid of a good-going fire, you may obtain a very high standard of purity, and a cold draught, of perhaps 150 feet per minute, in the only habitable part of the room, that

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is, in the only part where the air is fit to be breathed. Our object, of course, must be to make every part of a room habitable, and to leave not one stagnant corner in it. In this way alone can we secure in the highest degree both essentials of a healthy dwelling —pure air and warmth. Now, we shall find that the lower the ceiling the more easily can this combination be secured.

Let us look a little more particularly at the superior facilities offered by the low room. The top of the door, from which I think the greater part of the air required should come, is necessarily near the ceiling, and the current will therefore completely disturb the upper stratum of air. The air from the window will have the same effect in a smaller degree, and both currents will be warmed by contact with the ceiling. We need never look to the floor as an air-warmer, except to a limited extent near the fire; a much larger area of the ceiling is heated, and in a low room there is not only a much larger area of ceiling to heat than there is in a high room, but the radiant heat upon it being more intense, it becomes an air-warmer of immensely greater power; and, obviously, this extra power in a low room can be used either to raise the temperature of the room, or to raise a larger supply of air to the same temperature. Besides, if in this way we are able to admit more fresh air near the ceiling, we shall also, in like proportion, be able to reduce inlets at a lower level, and to that extent get rid of cold draughts. Practically the quantity which can safely be admitted is limited by the means of warming it; the more we can warm, the more we can safely admit. I insist very much on the importance—the absolute necessity—of this heating in connection with the ventilation of small houses. Some people seem to think that hot air and foul air are synonymous terms; it would be much more correct to say that cold air and foul air are synonymous. If the fire burns up, and the room becomes over-heated, the window will soon be opened, and even if the atmosphere remains warm it will be wholesome; but where the fire burns low, as the winter evening closes, and the ill-clad mother clasps her suffering infant to her breast for warmth rather than for nourishment, what wonder if we find the air close and impure, and every inlet crevice stopped with what we are pleased to call 'perverse ingenuity?' If we wish the occupants of small houses to admit plenty of fresh air we must not only convince them that it is good for them, we must show them how to do it without sacrificing something else which is good also—which is even better in their estimation—namely, comfort.

In conclusion, I desire earnestly to invite the attention of Scotch local authorities to this subject. It is clear that if I am right in the views I have advanced—if it is the fact that from a sanitary point of view a low ceiling is as good as a high one —much more if it is better—municipal authorities are utterly wrong when they prevent by legislation (as some have done, and others wish to do) the erection of low-ceilinged houses. It simply comes to this, that by such regulations they wastefully increase the rents which the working classes must pay for house accommodation, and thereby in the most direct manner encourage over-crowding with all its attendant evils; while at the same time they effectually prevent the erection of improved dwellings, such as are now common in London and elsewhere in England. Within the last few weeks I have seen in a street twenty feet wide an admirable tenement of artisans' dwellings seven storeys high. According to our draft Police Bill, the height would have been restricted to one storey—*one* family only would have been allowed to dwell where it has been proved to demonstration that *seven* can be housed with much more comfort and much less expense. Surely it would be difficult to imagine a more striking illustration of the mischievous effect of misdirected sanitary zeal.

ON THE DISABILITIES OF INSPECTORS OF NUISANCES, AND THEIR REMEDY.*

By E. C. Robins, F.S.A.

I was recently desired to take the chair at the establishment of a society, to be called 'The Association of Public Sanitary Inspectors,' and I acceded to the request because I have long felt that the labours of that useful body of men—better known as 'Inspectors of Nuisances,' are too often handicapped by conditions very unfavourable to the satisfactory discharge of their duties.

The duties which devolve on these public officers are of a nature to bring them not only into contact, but also into antagonism, with their employers; and influences are brought to bear upon them which render it often an unpleasant and ungracious duty to put in force the provisions of an Act designed for the public benefit, but opposed to the personal and private interests of parishioners, many of whom are members of the vestry, guardians of the poor, or sit on local boards of health in the district. The support which the inspectors have a right to expect from their superior officers, such as the parish surveyors and medical officers of health, is oftentimes grudgingly given, or absolutely withheld, in cases where influential members of the local authority are concerned. Medical officers have over and over again pleaded their inability to carry out the improvements they desire, because they are not made sufficiently independent of their employers, many of whom are also their private clients. Earnest men, anxious to do good work, become *marked* men, and are looked upon as meddling and officious persons, so that unless a grievance is brought to the officer in the ordinary form of a complaint, he hesitates to report the existence of nuisances which it is of great importance to the public health should be remedied at the earliest stage of their conception. In short, the preventive measures which it is so important to institute prior to the breaking out of a disease, are postponed till the disease itself has appeared, and thus remedial measures are resorted to when too late to prevent their necessity. Periodical house-to-house inspections are essential to the due performance of the duties of an officer of health, or inspector of nuisances, in the neglected portions of his charge.

I am aware that the extent of the areas under the supervision of the inspector is oftentimes too large and unmanageable for him to do more than attend to the complaints made, and little time is available for what he would consider supererogatory labours; and until the public understand the importance of these labours, they will not deem it desirable to

* Read at the Sixth Congress of the Sanitary Institute, Glasgow, September 1883.

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augment the staff of such assistants. But it is penny wise and pound foolish to act with parsimony in the matter of the preservation of the public health, the loss of which entails upon the parish such heavy responsibility and expense, especially in times of epidemic disease, and so largely increases the pauperism of the lowest classes, and the consequent burdens of the ratepayers. The preservation of the purity of the drinking water; the provision of a sufficient supply for cleansing purposes; the regulation of the drainage, the rapid removal of excreta, and proper ventilation of the system adopted; the removal of refuse and accumulated vegetable and other matters in private houses, manufactories, slaughter-houses, and dairies; the prevention of over-crowding; the use of insanitary dwellings with marshy surroundings; the obstruction to the sale of unsound meat and other food, &c., are all matters of vital interest to every member of the community. For, as a late divine observed:—'Everything that tends to promote the welfare of the poorer classes, tends to the stability of the noble institutions of this country. He that connives at, and disregards the suffering, misery, and degradation of his neighbours, will not escape with impunity, for what he leaves to breed pestilence in the dark alley will arise and reach him in the grand square, and show the rich that they are never safe as long as they neglect their duties to the poor. The sanitary question was second only to the educational; air, water, and cleanliness have much to do with the moral condition of our country.'

The vested interests of owners of inferior house property oftentimes stand in the way of public improvements of a sanitary character, because such owners have not yet learnt the increment of value which appertains to sanitary dwellings. Vestrymen also, as a rule, own a considerable part of such property, and therefore think themselves aggrieved if the parish officers exercise too indiscriminate and impartial a supervision of it, and consequent readiness to report unfavourably upon it.

How is this to be met? By the bringing to bear thereon the force of *public opinion*. But how is this to be done? I will give you an instance of how it *was* done in the year 1853, by a private society of which I took the management, and published the result of our labours in 1854, in the form of a pamphlet entitled, 'A Practical View of the Sanitary Question.' This society was established by the incumbent of a church in the metropolis, who associated the leading men of his congregation to form a local board of observation, by whom a house-to-house visitation was instituted. The paid inspector reported to me, as hon. architect, the state of every house in the district, and I served notices in the following form;—'I herewith give you notice of a nuisance existing on your premises, viz. (description of the nuisance). And I hereby require you to remove the same in accordance with the provisions of the Nuisances Removal and Diseases Prevention Act.' In short, though possessed of no positive legal authority, our moral force was found to be sufficient. We made it our business to require what the spirit of the law required, and in the event of opposition we had only to point to the sanitary Acts of Parliament, and threaten to place the case into the hands of the legally constituted parish authorities, requiring them to put in force the powers with which they are entrusted for the protection of the public health. Our experience proved that the majority of householders were more willing to accede to the mild representation of the requirements of the law made by the board, than to brave the interference of the strong arm of the law itself, which constituted the reserve artillery, which the board did not find necessary to bring into action in so many as half-a-dozen cases out of ninety-three landlords with whom the board had occasion to deal.

Mr. Tom Taylor, secretary to the General Board of Health, writing to me on June 12, 1854, says:—'If the constituted local authorities, whether in the metropolis or in other cities and towns throughout the country, were generally actuated by the same zeal, and guided by the same intelligence in the exercise of the powers for sanitary improvement which the law has vested in them, as have inspired and regulated the purely voluntary and unofficial efforts of the Local Board of Health for the Regent Square District, I am to express the belief of this Board that it would be seen that, however defective may be the laws for the protection of the public health, it is the will and knowledge to put those laws in force that are most needed to effect the removal from amongst the dwellers in our towns of the principal sources of premature death and preventable mortality.' As a matter of fact, the result of a single year's unofficial work in one small corner of the immense parish of St. Pancras was, that '1017 separate sources of infection were abolished, 4,000 cubic feet of fæcal matter were removed, and 6,180 lineal feet of foul house drains were cleansed or renewed.' I have not learnt what was done by the parish inspectors of nuisances during that year, but since our district was but the 280th part of the metropolis, if similar philanthropic boards of health had been established throughout London, no less than 284,760 separate sources of infection would have been abolished, 1,000,000 cubic feet of fæcal matter removed, and 328 miles of foul house drains renewed or cleansed.

The following is an extract from the report of Dr. Sutherland on epidemic cholera in the metropolis, 1854, as published in the Blue Books, and is therefore an official approval or endorsement of the plan of operations adopted by us:—'It was not considered necessary at that time (September 1854) to institute any inquiry by inspection within the City of London, or in the large parishes of St. Pancras or Marylebone, because the epidemic had visited them with comparative lightness; and, moreover, the president had reason to be satisfied with the activity of the local authorities, and with the proceedings taken by the local sanitary committees. The voluntary exertions of the Local Board of Health of Regent Square Church district, St. Pancras, headed by the incumbent, are worthy of the highest commendation, as affording an example of how much good may be accomplished, even in the present defective state of the law, by vigilance and well-directed effort.' I suspend on the walls a plan of this district, and a list of the owners of the property incriminated, and the works required in each case to be done, which extended to 211 separate houses, but no less than 2,491 primary and supplementary inspections were made, and 172 notices served on 93 different landlords, many of whom were vestrymen.

And now what is my *moral*? What is my remedy for the apathy of the public? My specific for quickening the consciences of owners? My suggestion for the support of these public officers to whose disabilities I have referred?

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Why, simply this. Let the energetic few in every district, in every parish, take the matter to heart, and forthwith establish a private society such as that the success of which I have described. Let their honorary, self-sacrificing labours for the benefit of all exercise its moral influence on the rest, and let their house-to-house inspection result in drawing the attention of owners to the insanitary state of their premises, and they will achieve a greater saving of life than will ever take place by the action of the auxiliary forces, the so-called volunteers. Let us establish a sanitary, life-saving, health-giving volunteer movement, and let the officers of the parish authorities feel that they are supported in their arduous and unthankful labours by the public sympathy which such institutions will prove, and we shall hear no more of the unrighteous use, made by the powers that be, of the influence they possess to the discouragement of honest, earnest, and capable public sanitary inspectors.

Since writing the above, my attention has been called to a letter on behalf of working men addressed to the papers by Miss Toynbee (daughter of the late celebrated and self-sacrificing aurist) who is the hon. secretary of a society just established, entitled the 'West Marylebone Sanitary Aid Committee.' In this letter the urgent need of applying sanitary principles to the homes of the poor is very ably enforced, together with the fact that the agencies at present existing do not achieve the desired result. Neither the 'Sanitary Protection Association' nor the 'Sanitary Assurance Society' has succeeded in reaching the homes of the working classes. The co-operative principle upon which these philanthropic societies are based has reduced professional fees to a minimum, without inducing owners of small properties to become members. The parish authorities only attend to cases brought before them, and the poor, not being owners of the property they occupy, find difficulty in getting their homes made healthy, but the 'Sanitary Aid Committee' referred to have pledged themselves to undertake the investigation of complaints *made to it* by district visitors, clergymen, or the tenants themselves, and to report them to the parish authorities. It has not yet ventured upon a house-to-house visitation, but doubtless this will follow, the St. Pancras example, before described, having proved that the one system is not more likely to give offence than the other.

The Marylebone plan has, however, the advantage of lessening the outgoing expenses of the committee; the parish officers alone being employed instead of the independent and specially paid inspector, directed by an architect or surveyor, who might not always be found both able and willing to act in an honorary capacity: consequently I deem this most recent local effort of sufficient importance to warrant my pressing it as an example upon the attention of the philanthropic public, the extreme simplicity of its organisation being its best recommendation.

In conclusion I may state that there are other disabilities of inspectors of nuisances, some of which have been summarised by one of their number as follows:—'We get no credit for work well done, because—1. We are not districted; 2. We never make reports to the Board; 3. Our names are never mentioned in the annual reports of the medical officers of health.'

Doubtless the work done by the inspectors has not received much direct acknowledgment, and this is a discouragement. But in connection with the new 'Association of Public Sanitary Inspectors' opportunities will occur not only for stating their grievances, but of popularising their work.

The Sanitary Institute of Great Britain has established an examination for testing the technical qualification of junior officials; and if the new society encourages the rising candidates for such offices to obtain their certificate, this will do much towards establishing a more liberal recognition of their merits in these days of competitive examination for official positions of any kind. It may also encourage the Sanitary Institute to admit public inspectors of many years' standing and approved capacity to their associate class of members without examination, being full members of the Association of Public Sanitary Inspectors. The objects of which association are thus defined:—1. The promotion and interchange among its members of that species of knowledge and practice which falls within the department of an inspector engaged in carrying out the duties imposed upon him by the Public Health, Local Government, and other sanitary Acts of Parliament. 2. The general promotion of the objects of sanitary science in connection therewith.

NOTES ON HOUSE SANITATION IN AND AROUND GLASGOW.*

By GILBERT THOMSON, M.A., C.E.

Resident Engineer of the Glasgow Sanitary Protection Association.

DURING the past year I have examined on behalf of the Glasgow Sanitary Protection Association close on three hundred houses. A number of these were country houses of various size, but the majority were in the city and suburbs of Glasgow, and varied from single flats to some of the largest and most expensively fitted houses in the district. As a rule, however, they were of the better class. In the course of these examinations, a great amount of both good and bad work was seen, and the following notes have been selected as being likely to be of general interest. A first-class house in Glasgow contains a considerable amount of plumber work, and from what I have heard of other places, my impression is that the quality here is rather above the average. The laying, and more especially the repairing of fire-clay drains, is to a considerable extent in the hands of the plumbers. In considering the drainage system of a house, everything outside the main trap or traps may, as a rule, be disregarded. There are many instances, however, in which that does not hold good, and where the state of the sewer outside the trap may affect the house almost as seriously as its own drain. It is no uncommon thing to find a terrace in which the common sewer runs under the front or back areas of the houses, sometimes so close that there is not room for a trap between the house wall and the sewer. The condition of the sewer is often very doubtful, and unfortunately, except by actual opening up, it is very difficult to discover if anything is wrong. In one such sewer, which was exposed recently, the joints of the pipe were perfectly open, and on three or four lengths of pipe there was a fall the wrong way of three or four inches. Naturally the foundations of the house were far from dry.

* Read at the Sixth Congress of the Sanitary Institute, Glasgow, September, 1883.

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In the same connection may be mentioned the danger which may arise from the bad drainage of adjoining houses. The following case illustrates that very strikingly:—An outbreak of diphtheria took place in one of a row of self-contained houses, and the proprietor, suspecting his drains, employed a plumber to put his house in order. The drains were found to be very bad, but were thoroughly overhauled. Not very long after there was another outbreak, and our association was applied to. The house was examined and found to be very satisfactory. Permission was then obtained to test the two adjoining houses, and a quantity of paraffin was introduced into the drains of each. In a few minutes the smell of paraffin found its way from one of them into several parts of the house first tested, causing a strong suspicion that the disease germs had got access in the same way.

Coming to the house system itself, the main trap is the first thing to be noticed. The form most commonly met with is what is known as a common lying trap, that is, a syphon bend with a centre eye for cleaning. There are also a number of built cesspools, more or less tight, but both of these are gradually being superseded by ventilating traps, which are designed to admit fresh air into the drain. Of these Buchan's trap is the one that is generally used. The change is doubtless a great improvement, but it does not do to entrust the alteration to unskilled hands, for some men have evidently no idea whatever of the use of a trap. The following case came to light recently:—

A proprietor was not very sure about his drains, but in order to make sure that no gas from the main sewer could enter the house, he had a Buchan's trap put on the outlet. Some time after a house two or three doors off was tested with paraffin, and in the basement of this carefully guarded house the smell was felt very distinctly. An examination was then made of that house. The drain was found to be in bad condition, and the trap was arranged with great care, so as to be absolutely useless. It had two openings, one on each side of the waterseal. The one on the sewer side should have been plugged, and only opened if required for cleaning, while that on the house side should have had a grating at the surface for ventilation. In this case, however, both were left open, a brick box was built round all, and a close-fitting flagstone was set on the top. The passage thus formed over the trap was evidently taken advantage of both by sewer gas and by rats. In another house a Somerset trap, which is somewhat similar in construction, was set in a style not much better. The following plan was still more efficacious for the admission of sewer gas. An old house had a built drain under it, which passed to the sewer through a built cesspool, trapped by means of a stone tongue. The drain, apparently, had not been tight, as a bad smell was complained of. Thereupon, men were set to open the drain and to lay a fire-clay pipe through the house. This they did by taking off the covers of the drain, laying a fire-clay pipe in the bottom, and replacing the covers. The end of the pipe merely projected into the cesspool. This arrangement, of course, left free connection between the cesspool and the old drain, *outside* the new pipe. To make a complete job the tongue of the cesspool had been broken, either during these repairs or previously; and its trap being thus destroyed the house was left in full communication with the sewer. Fortunately the atrocious smell led to an investigation before anything worse than occasional sickness had resulted.

With regard to the house drain, it would seem that the average Glasgow house, though very far from perfect, is considerably better than the average London house. The drains are often found to be leaky and dirty, but it is a rare thing to find a house in which the bulk of the sewage at least is not passing away. The great majority of the drains are fire-clay pipes, sometimes cement jointed, sometimes clay jointed, and sometimes not jointed at all. A large number of them are found to be defective when tested with paraffin or smoke. One case was very instructive as showing how a very bad state of the drains might be quite unsuspected, even on a partial examination. The house was a comparatively new one, perhaps three or four years old. The drain was readily accessible at an open trap outside the house, and on running water from various baths and closets it was seen that the water came freely and clean to this trap. On testing the drain with paraffin, however, the smell appeared immediately throughout the basement, and it was found that a branch of the drain from the foot of a soil-pipe was for a length of six to eight feet smashed to pieces. The soil-pipe was only from one closet, which had not been tried at first, but it was sufficient to convert a space of several yards square into a dunghill. Curiously enough, no smell had ever been felt, and no illness had ever taken place in the house. A common mistake here is the excessive size of the drain-pipes. I have seen a 12-inch pipe from a single soil-pipe, and 9-inch pipes are very frequent. Cast-iron pipes are beginning to be used here for the horizontal drains, but as yet to a very limited extent. They are generally coated with Dr. Smith's composition, and jointed with lead. The usual diameter has been six inches. Though there is no doubt that a fire-clay pipe may be made tight, there is I think as little that the iron pipe is superior.

Lead is now almost discarded here as a material for soil-pipes, iron having taken its place. The joints are made generally of red lead and hemp, staved into the faucet. When the pipe is heavy enough, and when the jointing is well done, the job is a safer one than a lead pipe would make; but there is the danger that light pipes which will not stand proper jointing may be used. On the whole, however, I have found fewer defects in iron pipes than in even comparatively new lead ones.

In a great number of cases the same pipe does duty both as a soil-pipe and as a rain-pipe, the lower part being 4 or 4½ inches diameter, and the upper part about 3 inches. I have frequently found, in testing, that a smell of paraffin which was felt in the house was distinctly traceable to the top of a rain-pipe, from which it was blowing in through a ventilator, a skylight, or cupola, or even under the slates. The entrance of foul air in this way is therefore not merely a theoretical possibility, as it is often thought to be, but an actual fact. Offices, warehouses, and the like, with low-roofed wells surrounded by higher buildings, frequently receive foul air from the short rain-pipes.

There is one advantage, however, in the practice of using rain-pipes for soil-pipe ventilators, and that is that it ensures some sort of continuity in the pipe, and that it will end outside; otherwise there is no saying where the air-pipe may go. This of course refers to existing houses more than to future ones. I

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have found a house in which the air-pipe ended in the attics, and another where a pipe, which appeared outside the roof as a proper air-pipe, had a want of continuity, part of it having slipped down, with the result that the drainage system was largely ventilated into the nursery. Zinc pipes, more or less tight, are sometimes seen. On the other hand the arrangement is, in many cases, found to be very good, and the workmanship thorough, for a large number of plumbers in Glasgow are quite competent both to design and execute good work.

The practice of putting up separate pipes for closets and for such fittings as baths and basins is extending greatly, and besides its other advantages, has the important one that the connection of the closet-trap into the soil-pipe has a much better chance of remaining tight when no hot water passes through it.

Of the water-closets in use here, the pan-closet is most frequently met with, even in the better class of houses. In them, however, it is steadily being displaced, the usual substitute being the Bramah. The writings of sanitarians have been effective so far that a considerable section of the public is quite aware that a pan-closet is not a good thing, and this will, no doubt, come to be more and more considered by builders. In new houses pan-closets are sometimes put in, which in their outside appearance and mountings have, when boxed in, some resemblance to Bramah closets. Bramah closets are largely manufactured in Glasgow by a number of makers. The frame and trunk are generally of iron, and the valves have India-rubber seats. They are made at prices ranging from about 2*l.* 10*s* to about 4*l.* 10*s*. Many of them have ingenious lever arrangements to give a short lift, but I am not sure that the advantage is worth the extra cost. There are also a number of wash-out and hopper closets used, the prices of some of the latter being as low as 10*s*. or 12*s*.

When Bramah closets are used, syphonage of traps is a very decided danger. It is seldom safe to assume that any such closet is certain to leave both its own trap and the neighbouring traps full of water, and the test which I generally apply is to disconnect the water supply, fill the basin up to the overflow, and, when the water has come to rest, open the valve. The seal of the trap is then measured, and compared with the measurement after running water slowly in. A look out is also kept at any fittings near for the sound of air gurgling through their traps. On referring to my notes, I find that about 250 Bramah closets have been thus tested, and of these about 60 affected distinctly either their own or neighbouring traps. The latter case is the most serious, because usually the closet trap in actual use will be filled again at once, but if a basin or bath trap is syphoned it may remain empty for an indefinite time. One such case was a basin close at the side of a bed, the trap of which was invariably emptied by the use of a closet off the staircase. When a closet with what seems to be a sufficient air-pipe acts in this way it generally turns out that the air-pipe is choked or obstructed, as, for instance, by a bird's nest. It is a common practice to provide ventilating pipes from the trunks of closets, both Bramahs and pans. These pipes, in a number of instances, lead to a serious defect, as by them the trunk of the closet is sometimes directly connected with the soil-pipe, the assumption evidently being that the current of air will always be upward and sufficient to prevent any back draught. This, of course, is very far from the truth.

Basins and baths are occasionally found to syphon their own traps, more especially when the outlet-valve is closed, before all the water has passed out. The most common case is when a small pipe has been put up for one or two basins, and is not ventilated at the top. In one such case a ventilating pipe from the top of the trap was recommended. Shortly after we were informed that this had been done, but that the gurgling sound was as plain as ever. An examination showed that the ventilating pipe had certainly been put in, but that it was connected to the wrong side of the trap.

The water supply in Glasgow involves less danger than it does in many places, as the greater part of water for drinking and cooking is now drawn direct from the main. In most cases the scullery and pantry sinks, at least, are supplied in this way, and the general rule now is, that all baths, basins and sinks are supplied direct from the main. In addition to this, it is compulsory that in all new work, the cistern overflow pipes should end openly, and this removes one chance of pollution. The old place for the overflow pipes was into the bottom of the closet trap, and, much more rarely, they are found to be run direct into the soil-pipe, and in these cases they are generally trapped in some fashion. These traps are usually dry.

One very fruitful cause of danger is the thoughtless disuse of various fittings. The idea is very prevalent that when a closet or basin is little used the danger is correspondingly small, and I am frequently told that 'this closet is hardly ever used;' the inference often being that it is hardly worth while looking at it. The very reverse is of course the case. One instance of this I saw lately. A large house had a closet off a bedroom, but it was thought not to be a good thing, and ordered to be taken out. The closet was taken out, but the cistern was allowed to remain. The overflow-pipe of the cistern went direct to the soil-pipe, and had a bell-trap on the top. The chances were against this bell-trap being effective at any time, but the cutting off of the water made the matter quite certain, and left a good-sized opening for foul air to enter. Another house had a day and night nursery, each provided with a basin. This was thought not to be very safe in the night nursery, so the water supply was cut off. The trap before long was quite dry, but, fortunately, the danger was discovered soon after. Another instance of this was where a bedroom had been converted into a conservatory, and the basin into a flower-stand.

The examples I have given have all been found in and round Glasgow, except that the numbers of Bramah closets tried for syphonage include country houses as well. The country houses were, as a rule, less varied in their character, that is, more of them were either very good or very bad. The probability is that unless a country house is new, or has been recently overhauled, its drainage will be bad; and even if the work is recent it may not be above suspicion. In the older houses built drains of large size, and cesspools which are of course never cleaned, lie hidden in the most unlikely places, and very commonly the air from them can enter the house freely. It is, however, needless to generalise on such subjects with a view to showing that danger

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exists, as it must be evident now to everyone that bad drainage is extremely common and very dangerous.

SMOKE ABATEMENT.*

By W. R. E. COLES.

IN the presidential address of Captain Douglas Galton at the Congress held last year at Newcastle-on-Tyne, he reviewed in detail the influences of town atmosphere on health, and proved, by carefully prepared statements, that in twenty-three towns selected for their smokiness the mortality from diseases of the respiratory organs was largely in excess of the average, and from diseases of the zymotic class the mortality was more than double that of the rural districts. At the same meeting the suggestive papers of Mr. Ralph Carr Ellison and Dr. B. W. Richardson treated of these social evils directly begotten of a darkened and polluted atmosphere; lowered tastes and moral tone, craving for stimulants induced by lowered vitality, debasement of the poorer classes, especially, from the influences of unavoidably dirty homes and persons.

The efforts thus put forth at Newcastle-on-Tyne by the Sanitary Institute are noteworthy, for they have met with sound and promising success. Not only have various private individuals and commercial firms been stimulated to lessen the production of smoke in their particular cases by adopting improved heating apparatus, but the town authorities have been so influenced by public opinion and personal conviction that within the past fortnight it is reported that they have completed the substitution of improved furnaces to abate smoke at some of the Corporation works, which formerly produced a great deal of smoke, and, simultaneously with setting so good a public example, they have decided to issue a circular calling upon owners of steam vessels on the Tyne and all manufacturers to abate smoke to the lowest possible point. But though it has chanced that the Sanitary Institute have so far moved in other centres than this in the cause of smoke abatement, it is at the present Congress in the great city of Glasgow that the Council have authorised the first paper on smoke abatement to be submitted for consideration as a separate branch or department of sanitary science.

Nothing, I venture to think, can be sounder in policy than this decision on the part of the Institute, for the magnitude of the evil, as well as its peculiar character, alike mark it out for separate recognition and distinct treatment at the hands of the legislature, local authorities, sanitary, medical, scientific, and other professional and non-professional classes of the community. As a separate sanitary work none can exceed in value that which aims at, and is capable of, securing for the inhabitants of towns more of those vital and vitalising elements—sunlight and respirable air—than they now possess; and while thus occupying a unique and defined position in the department of sanitary science, and standing as an indispensable ally to that science as well as to every other effort aiming at amelioration of the physical and moral conditions of town life, the smoke abatement cause has other, yet wider and special claims of a social and economical character upon the attention of public bodies and private individuals.

* Read at the Sixth Congress of the Sanitary Institute at Glasgow, September 1883.

It seems unnecessary to deal *separately* with either the sanitary or the moral aspect of the smoke question at this time. The sanitary side of the subject has already been treated in detail by Captain Douglas Galton in the address I have alluded to; and others, among whom I may mention Mr. Ernest Hart, have statistically shown the largely increased mortality to be fairly ascribed to a smoky atmosphere. Medical opinion is virtually unanimous on the subject. Sir William Gull, Sir Andrew Clark, Sir Spencer Wells, Dr. Alfred Carpenter, and other eminent private practitioners, have publicly expressed their warm support; while from another branch of the medical profession—the medical officers of health—equally strong sympathy has been evinced. Dr. Tripe and Dr. Wynter Blyth were among the earliest members of the Smoke Abatement Committee, and from that time, and the earliest reports of Dr. Sedgwick Saunders to the Corporation of the City of London, down to the recently published report of Mr. Leigh, of Manchester, the support of the medical officers of health has been strongly expressed in favour of smoke abatements. Sir Henry Thompson has stated that 'the influences of sunlight, imperceptible as they may seem to us, are almost as necessary as the food we eat.'

The Sanitary Institute, the National Health Society, and other sanitary bodies, strongly urge the necessity for smoke abatement. Thus the evidence on this side of the case seems practically as strong as it can be; while on the question of there being social reasons for purifying the atmosphere, I don't think stronger evidence need be adduced than that given by Mr. Ellison and Dr. Richardson in the papers to which I have referred. I may perhaps mention a practical consideration advanced by Mr. T. C. Horsfall, of Manchester, namely, that one great evil of smoke is that it drives many of the upper and middle classes who can do so, to live out of town, and thus cuts off their association with town affairs, and their influence for good upon the poorer members of the community.

In view of these separate branches of the subject being so well authenticated and generally understood, it seems desirable to consider other general features of the case, and more particularly the actual cause of the evil, and the probability of its abatement.

As smoke is but the expression of defective heating processes, by its production these processes stand condemned. They must be improved. We must face the true issue. The production and application of heat must become raised to the level of a recognised and rewarded art and industry, before the ultimate success of the smoke abatement cause can ensue. The very term 'smoke abatement,' is, in a sense misleading, for it points but to an expression of evil—not to its cause. 'Heat cultivation' would more correctly indicate the underlying and governing principle on which thought and action must be based if we would intelligently address ourselves to rid the atmosphere of smoke and secure the advantages attaching to that great object. When we remember that heat agency lies at the root, and more or less intimately affects almost every civilised art, we see how large is the field for useful reform which opens before us.

In a broad sense it has hitherto been, and still is, the practice to obtain heat merely by heaping crude coal on a fire, regarding little the true character of the fuel, the apparatus in which it burns, or the duty

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actually required. So long as there is heat enough for the purpose in view that is deemed sufficient; the strictly exact and beautiful natural process called 'combustion' will not submit to such usage, and it punishes man in purse and in person to teach him to use his intelligence and amend his ways. These are but elementary truths, and trite ones to many, but this Congress cannot, I think, ignore them while it remains an urgent and essential necessity to sanitary progress that public attention should be thus directed to consider 'first principles,' in order to judge aright the true cause of, and true remedy for, the ills now suffered. Hitherto, as we know, the smoke question has been treated either slightingly or in a desponding or impatient spirit; perhaps the term 'nuisance' has had much to do with this. It does not suggest the true idea that smoke production, in the sense we know it, is a grave national calamity, calling for the voice and effort of the nation to contend against. The word 'nuisance' conveys, or has grown to convey, something of the kind known as 'annoyance,' something which must either be borne as inevitable, or be avoided by forcible measures. In this case, the force of sharp legislation has been tried both in modern and ancient times. In 1306, Edward I. decreed, by royal proclamation, that the buildings from which smoke issued, should be pulled down! In 1855 Lord Palmerston, then Prime Minister, proposed the more practical, but still inadequate measure, that 'a thumping fine,' as he is reported to have expressed it, should be inflicted; and the law was amended. But although legislation has undoubtedly effected considerable good by forcing a certain number of persons to yield to public necessity and abate smoke, still it is obvious that legislation has failed, and must fail, of its ultimate object so long as it is limited to its present scope and application. Beyond all, however, legislation far in advance of general public opinion cannot, as we know, be practically operative, however really beneficial its character may be. Although it may be expedient to hold public inquiry into the smoke abatement question by a Royal Commission as has been proposed, to consider immediate extension and amendments of existing laws for the suppression of smoke in view of the various changes which have occurred since their enactment, still it seems to me that the great aim of those who seek to advance the cause of smoke abatement should be much more directed to awakening and stimulating general public interest on the grounds I have alluded to, than to discussing legislative remedies or particular methods of smoke prevention.

It is frequently urged that local authorities are at fault in not enforcing laws in restraint of smoke. Doubtless there is some foundation for this charge, and also force in the complaint so frequently made that those who are called on to administer the law are themselves offenders against it. But these complaints often take the place of the practical consideration of how the state of things is to be improved. That seems overlooked, and those who administer the laws are not likely, as a rule, at any rate, to see the smoke question in a different light to that in which the general public view it. Their minds, like those of others, must be opened to the desirability and practicability of reform; but perhaps of all things pertaining to legislative reform, the greatest barrier to its advancement is the manifestly unfair basis on which smoke law has hitherto always stood—namely, that it has been levelled against *certain* trading classes of the community only! Besides this unfairness, there is, too, an impracticability about such legislation which must strike everyone who considers it. How can it be reasonably expected that masters or men who are accustomed to unlimited production of smoke in their own and neighbours' houses and elsewhere, should be imbued with any special views as to the necessity for absolutely preventing smoke in their works? As a rule they look upon the smoke laws as an irksome and unfair restriction on trade; and so long as they can by any means avoid penalties, they practically do no more to advance the object of the legislation.

It seems to have been generally accepted in the past and to remain now a fixed idea, that the smoke from domestic chimneys cannot be checked or dealt with at all by legislation. Must this view be held as absolutely correct now—and to apply as well to all future time? It would be wholly unreasonable to consider even the possibility of passing an immediate law to absolutely restrain smoke from private houses now existing. Were it even to be passed it manifestly could not be administered. For, as the late Home Secretary (now Lord Aberdare), said in a speech on the subject, 'It would be impossible to draw an indictment against a whole people;' but, as he went on to say, 'Supposing it can be shown that grates as cheap or cheaper than the present ones have been invented and could be applied, and that the result of using them would be an economy of fuel, we have then to consider whether the foundation has not been laid for the gradual application of compulsion.' Surely these words of his are worthy of consideration. In the case of *new* houses, at any rate, a great check might readily be imposed by the united forces of public opinion and suitably restrictive legislation.

The Government have set the example in the abatement of smoke by announcing that tenders for the new Admiralty and War Offices must provide for the most improved heating arrangements.

I do not know the annual rate of increase of new houses in Glasgow, but in London, in 1881, it was 26,170, or at the rate of about three new houses an *hour* for every hour of the year! In some other cities it has been proportionately as great. When we realise this enormous extension of new buildings, all with more or less defective heating apparatus, and what they are constantly doing to *increase* the smokiness of the atmosphere and swell the attendant evils of the vicious system which the smoke indicates; is it not our national duty, as well as our individual interest, to join the cause of smoke abatement? Unlike other great sanitary and social reforms, the desired relief will not have to be purchased by the expenditure of large sums of public money involving increased taxation; on the contrary, this reform may be wrought out gradually as, in the strictest sense, one of economical advantage to the present as well as to future generations.

Regarding the possibility of carrying out the reform in a thorough and practical way, we may be encouraged by the success which has already followed the efforts put forth. And it may be accepted as a fact, that the attention which has been directed to the subject has resulted in a large extension of knowledge and marked improvements in all classes of heating apparatus. It is generally admitted that our heating processes are, for the most part, primitive and unsatisfactory, and cheaper, less

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cumbersome, and more readily manipulated methods of applying heat are becoming more and more essential in all domestic and industrial operations.

The Official Reports of the Smoke Abatement Committees of London and Manchester are highly instructive and suggestive. They afford a comprehensive view of the character and efficiency of the best kinds of heating apparatus now available, and show the margin for improvements. For instance, it is shown that some domestic grates burn three times as much coal as others do, and produce six times more smoke; that some gas stoves burn nearly three times more gas than other stoves, and that some steam boiler furnaces burn more than twice as much coal as others for equal work; and that while some produce a great deal of smoke, others are practically smokeless. It is very important to notice that all the tests made were conducted under the superintendence of persons interested in the success of their particular apparatus, and therefore the results recorded by the Committees would undoubtedly show a higher range of efficiency than would be obtained in ordinary use by the public.

Mr. D. K. Clark, M. Inst. C.E., formerly of Glasgow, and well known for his elaboration of the works of the late Mr. Chas. Wye Williams and his own, on 'Fuel Economy,' states, in his report to the Committee, that the tests of open grates showed that only 42 per cent. on the average of the heating power of the coal consumed was utilised in warming the room. Professor W. Chandler Roberts, F.R.S., made a series of valuable and novel experiments to determine the compositions of the gases or 'smoke' given off from the chimneys, and ascertained that for one part of solid carbon, the blackening constituents of smoke, five parts of invisible but combustible gases (hydrocarbons and carbonic oxide) are discharged into the air. By the aid of these reports, the economic as well as the sanitary bearings of the smoke question is presented to our mind with some definiteness—a basis is thus established for future investigations and action.

Hitherto there has been no general treatment of the smoke question, nor any point to which interest in it might converge. A general complaint has been made against smoke, but no organised effort has been made to advance general knowledge on the subject, and ally public sympathy and public efforts to abate the evil in the common interest.

The future progress of the cause must, of course, depend mainly on the *extent* to which the public interest is awakened to recognition of the necessity and desirability of change, and to the *time at* which this influence is brought to bear. If the public support is favourable and prompt to extend the movement now in active existence, scientific minds and commercial interests will naturally be stimulated to continue efforts in an increasing ratio to supply public demand.

As one practical illustration of the speed and soundness with which these forces operate in the present day I may mention that in connection with an important series of competitive tests of gas cooking and heating stoves, now being carried on in London under the auspices of the Smoke Abatement Institution, it has been found that the character of the apparatus has actually been improved in several instances since the testing was commenced in the spring of the year. Improvements have been suggested to the minds of designers and manufacturers, and they have actually brought forward modifications of their own original apparatus for competitive tests. That considerable improvement has taken place in gas apparatus has been specially noticed in a recent report by the Smoke Abatement Institution, and it has been stated at some of the meetings of the Gas Company that a very large increase in the demand for gas for heating purposes has arisen. So far as the use of gas can be made available for reduction of smoke at Glasgow there is an encouraging prospect, for the name of Mr. Foulis stands high in the gas world as an admirable manager of gas works; and under his scientific development of gas manufacture the well-known system of heating the retorts (invented by Sir William Siemens) has been introduced on a larger scale than at any gasworks in the kingdom. Moreover, the coal of the country is suited to gas-making; and the manufacturers of gas apparatus in Glasgow are among the largest, if not actually the largest, in the kingdom.

The review of heating systems has also already led to the discovery or recognition of various collateral advantages being associated with changes tending to the prevention of smoke. Among them may be mentioned that, in the manufacture of coke, a saving of several millions sterling could be effected by the collection and condensation of the volatile constituents of coal, now poured into the atmosphere in the form of smoke; the development of furnaces suited to utilising inferior coal and gaseous fuel, and the introduction of appliances for labour saving. The important bearings of these several things on the commercial as well as social interests of the country are obvious, and at the present meeting of this Congress it is not too much to hope that they will find appropriate recognition and development, and that the work of this Section, presided over by Dr. Angus Smith, will, by introducing the subject of smoke abatement, have aided, in some degree, to fulfil the hopes with which he wrote his well-known 'Contributions to the Beginnings of a Chemical Climatology,' and that the atmosphere of Glasgow may become purer, and its inhabitants richer, by abating smoke which, as Sir William Siemens has expressed it, 'always indicates waste.'

SANITARY PRECAUTIONS.—The Vestry of St. Pancras have issued to every householder in the parish a valuable and concise code of 'Precautions against Disease.' It is printed on a card, and, after stating that 'the usual objection to sanitary notices, like the one in question, is that they frighten people about diseases,' proceeds to point out that no one will catch any disease by studying the recommendations of such an official circular, and, under the following headings, gives precise and very intelligible directions as to 'Dampness,' 'Dirt,' 'Cisterns,' 'Water-closets,' 'House Drains,' 'Sink and Bath Wastes,' 'Dust Bins,' 'Diarrhœal Diseases,' 'Infectious Diseases,' 'Disinfection,' 'Disinfectants,' and 'Patients and their Attendants.'

A NEW water-tower and tank, which has just been erected by the Corporation, at a cost of about 15,000*l.*, has been opened at Colchester. Speaking at the opening, Sir R. Rawlinson, chief engineer of the Local Government Board, pronounced the structure to be the finest water-tower in England.

THE maximum penalty of 20*l.*, or sixty days' imprisonment, has been imposed on a butcher of Edinburgh, named Farquhar, for having exposed for sale 82 lbs. of unsound horseflesh. When the police made the discovery, part of the flesh was being put through a mincing-machine preparatory to being made into sausages.

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THE TESTING OF DRAIN AND OTHER PIPES CONNECTED WITH DWELLINGS, TOGETHER WITH THE SANITARY CONDITION OF THE WALLS AND ADJACENT SUB-SOIL AS AFFECTING THE HEALTHY CONDITION OF HOUSES.*

By JAMES STEWART, Senr., Sanitary Engineer.

WHEN a necessity arises for an examination of the sanitary condition of a dwelling-house, a sanitary engineer, or other duly qualified person, is called in by the owner and requested to test the drains, &c. Unfortunately, however, these tests frequently extend no further than the house drains and vertical pipes. Then follows a report that certain defects exist in the drains and plumbing works, and such are recommended to be remedied and improved. The drains are then lifted and relaid, or it may be, as I have frequently seen, that the joints or junctions are only cemented as they lie. The work is done; but no attention is given to the swampy and malarious condition of the ground in the vicinity of the defects, which still remains in the same saturated state, due to the previous defects in the drains; or it may be from the still defective drains of adjoining houses, the level of which may be higher; or perhaps from ground water. The drains being finished, the saturated material is put back into the hole or trench, the floor is closed up, and if any thought is given to the condition of the sub-soil, it is that it will soon dry up, now that the drains are supposed to be perfect.

The methods adopted for testing the horizontal drains and vertical pipes are as follows, viz.:—

1. By the *smoke test*, relying upon *sight* and smell.

2. By the *paraffin*, *peppermint*, or other tests, relying upon *smell*.

3. By the water test, which also relies upon observation.

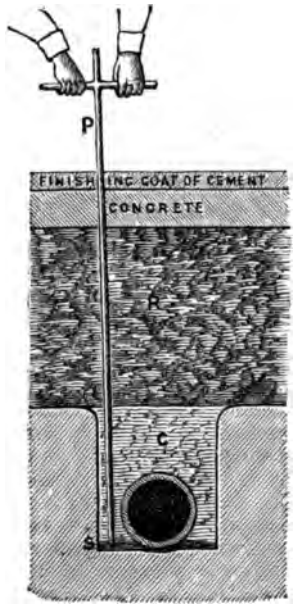
Regarding the test by smoke it may be considered very suitable, indeed, perhaps it is the best for testing vertical pipes and apparatus in a house; as any defect usually becomes visible at once by the smoke, or is apparent, more especially if the wood work covering the pipes is removed as far as possible; otherwise a current of air may carry the escaping smoke up the recess for the pipes, which generally extends from the basement floor to the roof.

As regards the testing of drains, I cannot speak quite so favourably in applying smoke to them: assuming that the drains are defective, there are many houses of which the basement or ground floors are covered with asphalte, Portland cement, tile or other impervious flooring, so that it is impossible for smoke to find its way through, except at some small opening at the foot of the soil, or other pipes passing into the ground.

Again, a considerable part of the subsoil of this city (Glasgow) and neighbourhood is composed of stiff clay; and it is the practice to dig out the trenches in this clay for the foundations of houses, deeper than the ordinary level of the cutting; the foundations are placed in this trench, and if the house is one of a street or terrace, the drains must go through the houses. A square trench is usually made for the drains, which cuts through, or crosses the foundation trenches on much the same level; the consequence is that any leakage or sewage from the drains runs along these trenches and so saturates the walls. A case of this description has come under my care where the water from a soil-pipe flowed twenty feet along the foundation of the back wall, then turned inwards and along between two gables for thirty-five feet, and came out below the floor of the front room of the next house, which was on a level of between two and three feet lower. In the filling in of the trench the clay or stiff soil is thrown in upon the top of the pipes, and falls partly down the sides; but, on account of the narrowness of the trench, the bottom part cannot be properly filled; then the whole is rammed level with the surface of the ground. It will be better understood from the drawing what I wish to describe, and you can infer that from the stiffness of the clay, with careless filling, a space is left along the bottom on each side of the pipe. When the house comes to be occupied, the sewage escapes into this space from the bad joints and junctions, the result being that the foundations are sapped, which I think explains why the partitions and walls of so many houses are cracked.

To return, however, to the testing. I have often found it difficult, on account of the formation and filling in of the drains as above described, to obtain the results I expected, being convinced in my own mind that the drain was really defective, but between the clay covering the top of the drain and the impervious formation of the floor no smoke could be seen.

To overcome this drawback I adopted the plan of probing the ground with the instrument noted on the drawing. Some care and skill, however, is necessary to fix upon the suitable place, so as to use it to proper advantage. I have used this probe with the best results, viz., to ascertain actually that the smoke was really escaping from the drains, and to



P. Probe made of ⅜ square iron steel pointed 4 ft. 4 in. long.
S. Sewage (escaping).
C. Clay in trench.
R. Rubbish and clay.

* Read at the Sixth Congress of the Sanitary Institute, Glasgow, September 1883.

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satisfy myself as to the state of the ground surrounding the pipes, the point of the probe indicating the state of the soil at the bottom of the trench.

I may mention other instances in which the full effect of tests by smoke may not be attainable, however bad may be the state of the drains. The junction of the house drain with the main sewer not being air-tight, the existence of rat-runs in the ground, or the presence of porous rubbish under the floors, all interfere most seriously with the efficiency of the test. Again, take the case of a new or unoccupied house in winter; the temperature of the air contained in it is lower than that of the air in the sewer, consequently a current of air exists flowing from the house into the sewer and carrying the smoke with it.

There is also another instance of very frequent, if not constant occurrence, where the escape or appearance of smoke cannot be observed, which is that, although the upper parts of the joints are filled with clay or cement, small parts at the bottom are left quite open: these may arise through the carelessness of the workman, or may be left open with the idea of draining the ground; but the reverse takes place; the open part of the joint is therefore constantly sealed with water, and no smoke can escape. As to tests with the smoke machine, attention should be given to the length and capacity of the main drain and its branches, the soil, and other vertical pipes; that is, if it is a large house, with a 9-inch main drain, and branches, with a high soil-pipe, rain-water pipes, &c. (as many of our best houses have). I am of opinion that the miniature smoke machine some tradesmen use is quite inadequate to produce the desired result of a satisfactory test, as such a machine cannot have power to maintain a sufficient supply of smoke necessary to test the drains and pipes of a large house. I have frequently heard it remarked that the smoke test is too severe. If the pressure was as great as some people suppose, we might expect to see the smoke blown through the sealing water in the trap; such an occurrence, so far as my knowledge extends, I have not seen: all that can be observed is a slight movement of the water at one or other of the traps when the machine is in action.

We will now consider the second method of testing, viz., the paraffin or peppermint test; but as I have entered so fully into the smoke test it is not necessary I should detain you with any lengthened observations on this method of paraffin, &c., &c., as they are so far similar in composition and action, viz., air with smoke, or air with the smell of paraffin or peppermint.

My remarks will, therefore, apply as to whether it can supersede the smoke test and give better results; from my experience I am inclined to give smoke the preference, from the statement already made as to the uncertainty of the smoke test when applied under certain conditions to the horizontal drains in the ground; the same will apply with greater force against the paraffin or peppermint test, both of which I consider to be trifling, uncertain, and misleading, if either of these are alone to be depended upon.

Nevertheless, in answer to this, it will be remarked by some, 'that paraffin discovered the defects in my drains;' but I am quite as certain that many more will afterwards find out by other means the serious deficiencies that the paraffin did not discover. I could dwell longer on this point of the subject, were it not that time is limited; therefore I will now pass on to the third method of testing, viz.: 'The Water Test.'

I have pointed out the injurious effects of the escape of sewage; but the injury resulting from the constant outflow of moist sewer air into and saturating the ground under the floors is a serious evil; it is therefore indispensable that the drains should be both air and water-tight. The application of the water test to the main drain of a house is, in my opinion, by far the best method, and is therefore superior to the other methods I have referred to, for is it not the fact that the object we endeavour to accomplish is to have the drains water-tight. This method is not generally practised, perhaps from the want of a suitable apparatus of easy and simple application, or it may be from a desire to avoid the certainty of showing whatever defects of construction may exist. The *modus operandi* is this: the pipes should be entirely stopped up at the ends and filled with water, some upright part having been previously selected or formed for the purpose of observing if the drain holds the water, or the reverse; the other ends or branches having been closed in a similar or sufficient manner, the water may then be turned on, and the pipes filled to the part marked on the upright pipe, and carefully watched to see if the water falls below the mark; and should it do so it shows at once there is a leak somewhere, and no doubt can arise as to the actual results of this method of testing, and nothing is more certain or satisfactory. Another advantage to be derived from the water test is, that the proprietor or tenant can have the satisfaction of observing the effects of it, either by showing the *efficient* or *deficient* construction of the drains at the upright part selected and marked for the purpose; this he could not follow out so well or readily with the smoke or paraffin tests; and in the event of a new drain being tested the workman might be apt, on a defect being noticed, to fill it up hurriedly to hide it; such an attempt would at once be detected on the application of water. In the majority of houses that I have been called on to examine, I should not consider it at all requisite that any tests should be applied, as the damp appearance of the walls, and sometimes the floors, are sufficient of themselves to tell the true state of matters below. The damp plaster is observed in some cases rotting above the parts that have been repaired with Portland cement, this repair having been done with the mistaken idea of keeping down the damp, or may have been done at the time of the last overhaul of the drains: such expectations are not realised; the insufficient relaying of the drains, or the neglect of draining the sub-soil is soon shown by the above-mentioned indication; and in addition by the paint at many places along the foot of the walls being destroyed, and getting daily worse, as the sub-soil gets more impermeated. Nothing else could be looked for, when at this overhaul of the drains, in addition to the very objectionable way of filling up the trench, no attention is given to the aëration of the ground and ventilation by the air channels under the floor; and should the floors be formed of Portland cement, asphalte, Cairhness stone, or tile laid upon a cement *bed*: as all of these are considered to be practically impervious, the damp is sucked up by the powerful action of the house fires, and is sure to find an outlet, which it does as I have stated through the walls.

Professor Pettenkofer and others, in their re-

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searches on this important subject, have sufficiently demonstrated the permeability of air and damp through walls, and it may not be out of the way if I give one or two quotations from such authorities.

Professor Pettenkofer, in his work, *The Air in Relation to Clothing, Dwelling, and Soil*, states at pp. 80 and 81, 'England has given proof how the public health can be improved by keeping the soil clean through good drainage, abolition of cesspools, and abundant water supply.' He also says, 'This is my conviction, which I want to impress upon you, that the cleanliness of the soil, and diminution of organic processes in the ground of dwelling-houses is most essential.' Also Colonel Geo. E. Waring, jun., the celebrated American engineer, in his work on the *Sanitary Condition of Dwelling-houses* (1877), at p. 51, remarks: 'We know very well from a difference in salubrity between houses standing on proper sites, and houses standing on improper sites, that this influence of the soil emanations is serious; probably, so far as the usual slighter malarial ailments are concerned, this soil influence is the most serious with which we have to contend. And at the same time the debilitating effect of the exhalations referred to—headache, neuralgia, loss of appetite, intermittent fever, &c.—take a far lighter hold upon the popular imagination than do often the fatal diseases which are produced by bad air of another sort. The low condition, and consequent susceptibility to infection, which the malaria of damp soil produces, doubtless aggravate very seriously the dangers arising from the other source; that is to say, persons enfeebled by exposure to malaria would often succumb to infection, when a robust person would withstand it.'

The foregoing observations regarding the actual results of testing by the smoke machine have been altogether applicable to drain-pipes; but the defects usually observed in the soil or other discharge pipes when applying the test to them, are insufficient water seal in the traps, open or cracked joints, and perforation of the lead traps or bends.

A great deal has been said and written on this popular subject. The cause of the destruction of the lead in this manner is by common consent attributed to the action of sewer-gas; it may therefore be considered bold on my part to come forward and question a subject so universally admitted as this alleged action of sewer-gas on lead pipes. I have given this particular matter careful observation for a number of years, and the conclusion I have come to is, that the perforation is caused by the vapour or humid air in the drains and vertical pipes, arising from the warm water discharged from the house. This vapour ascends till it comes to the trap, and there condenses in drops of distilled water on the upper side of the trap or bend. I have looked into a trap and observed the drops hanging, and have removed them with my fingers along with the part destroyed, as a substance which is chemically named 'carbonate of lead;' and as each succeeding drop forms it falls off, taking a portion of this substance with it, and leaving a clean surface for fresh chemical attack.

At the time of the outbreak of typhoid fever at Crosshill in March and April 1875 I was then acting as sanitary surveyor for the Govan Parochial Board, and during my examination into the sanitary condition of the houses I saw a good example of the action of vapour on lead, in the case of a lead-lined hot-water cistern connected with a tenement there. This cistern had a wooden cover, and there was a space between the water and the underside of the cover which was constantly filled with vapour, the action of which was seen in the coating of the leaden sides of the cistern with the substance I have referred to—a sample of which I have retained, and now show you; and although I hold that the action on the lead pipes is by the vapour and not by sewer gas, still the same remedy would require to be carried out—viz. ample ventilation of the discharge pipes. Dr. Alfred Carpenter, in his work *Preventive Medicine and Public Health*, states—'It is a soft and distilled water which acts so readily on lead. Then Colonel Waring, in his work formerly quoted, states at p. 33:—'These gases (sewer gases) have in a much less degree, *if they have at all*, the power of decomposing lead pipes.'

In my former remarks I have made reference to the re-draining of a house, the filling up of the trench with the same sewage-soaked soil. This practice, I may tell you, is going on every day in this locality, not only as regards the trench cut for the drains, but the whole water-logged area below the floors remains as it was prior to any alterations, attention not being given to the drainage of the ground water, neither at the time of the building of the house, or now, when a so-called improvement is made. This objectionable work that I have just referred to is being executed by tradesmen who have neither the skill, experience, workmen, or sufficient appliances necessary for carrying out such work. It is, therefore all the more necessary that these matters should be attended to when we look at the position of many of the best houses in this city and neighbourhood, viz., the site of the house is excavated out of a sloping bank, leaving high ground at the back, a raised roadway at the front; the back ground slopes to the house or back area, and consequently all the ground water, and perhaps the sewage water from a defective sewer in the lane behind, follows the slope of the ground, and permeates through the foundation. When this state of matters is combined with leaky house drains, you can readily understand what condition the house will be in: and though I merely state this as a hypothetical case, there are many houses in the surrounding locality in a similar condition, and where the configuration of the ground, although somewhat different, is equally telling against their sanitary condition.

A NEW FOOD.—According to the *Chemiker Zeitung*, M. Muller has evaporated skimmed milk in a vacuum, so as to obtain a permanent product which can be preserved for many months in a dry atmosphere, and which has valuable alimentary properties. He thinks that it may be of great use in pastry and in various kinds of baking, and the best sugar of milk can be made from it. The skimmed milk which is collected in dairies and cheese factories is usually given to animals or wasted in sewage; it contains, however, large quantities of salts and particles of butter and caseine, which can be utilised by Muller's method.

AT a recent meeting of the Blaydon Local Board it was stated that out of the fifty deaths which had occurred in the district during the preceding quarter, no less than thirteen were of persons exceeding seventy years of age, five of the deaths were of persons of more than eighty years of age, who had lived within a radius of between 200 or 300 yards of each other. One death was that of a person ninety-three years of age. The normal death-rate was 17 in the 1,000.

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THE MERITS AND DEMERITS OF VARIOUS KINDS OF WATER-CLOSETS IN GENERAL USE.*

By DANIEL EMPTAGE, S.E.

It is generally admitted by all who have made 'house drainage' a study, that the most carefully prepared scheme is frequently spoiled by an unwholesome W.C. apparatus fixed at its head.

It was experience of this nature which has induced me for some years past to pay particular attention to this subject, and by careful observations and experiments with various kinds of appliances, to endeavour, if possible, to find one which would work satisfactorily, and which might be rightly considered wholesome.

The 'Bramah' pattern valve closet is the oldest form now in use, and although many improvements have been made in its construction, those in use to-day are the same in principle as the one which Bramah patented in 1778. This closet works remarkably well, and has a capital appearance. The direct action drop of the water from the basin to the trap is also a good point, and the space between the seal of the trap and the valve being very small, very little foul air can accumulate or corrosion take place. If this closet is properly fixed, flushed, and ventilated, and a reasonable amount of care exercised in its use, it will answer very well indeed.

Notwithstanding, however, the good character which it deservedly bears, it has disadvantages which preclude it from being considered the best one for general use, the following being some of its faults:—1st. The liability of paper and other substances to become jammed between the valve and its seating, and thus allow the water to escape from the basin. 2nd. Its unsuitability for the discharge of slops, for which purpose all W.C.'s are at times used. 3rd. The liability of the overflow trap to become fouled, which not unfrequently takes place in consequence of the W.C. being used as a urinal without being properly flushed. 4th. The valve-box, although small, is a container of bad air, and is to that extent objectionable. These defects existed in Bramah's day, only perhaps in an aggravated form, and it was to obviate these evils that the notorious 'old pan' closet was invented.

If we consider the number of valuable lives which have been sacrificed, and the amount of misery which has been caused by the escape of sewage gas from water-closets and soil-pipes fixed inside of houses, it may well be doubted whether their introduction was really a benefit to mankind; but it is certain that the man who invented the 'pan' closet let loose upon society an enemy which has done, is still doing, and will yet do an incalculable amount of mischief. It is, I think, without exception the worst form known; and yet, strange to say, it has been the most popular, and is still used more than any other. Thanks, however, to this Institute, and to the efforts made by our leading sanitarians, the public are now becoming aware of its treacherous character; and, as a consequence, its doom is fixed, and the time will come when it will be a thing of the past—to be seen only in our museums. Seen from above it has a very fair appearance; it is, however, only a 'whited sepulchre.' Its interior surface, which is equal to about 5 feet superficial measurement, being generally covered by a mass of corruption. From this coating, undergoing decomposition, there constantly arises gases as offensive and perhaps as dangerous as those which escape from an ordinary sewer or cesspool. These gases being held between the two seals increase in virulence until released by the tilting of the pan, when they belch forth; and who can tell the amount of mischief caused through persons inhaling these poisonous vapours early in the morning?

It is well known that a toilet-pail, although constantly exposed to the air, soon becomes offensive unless frequently cleansed. Is it then at all to be wondered at that the interior of a 'pan' closet, which becomes infinitely more filthy and is entirely shut out from the air, should emit foul odours? I have several times tried to mitigate this evil by ventilating the container, but only with very partial success. There is but one remedy—viz., to take down the apparatus and burn it out. This, however, affords only temporary relief, for the moment it is again used the process of recoating begins.

It is only fair, however, to say that there are as usual exceptions to this rule, for I have known 'pan' closets which have appeared comparatively wholesome, but they have always been placed under very favourable conditions.

Besides the 'valve' and 'pan' closets, the only kind in general use up to the year 1852, appears to have been the old-fashioned straight hopper, which, owing to its shape and its bad flushing arrangements, was a most filthy apparatus quite unfit for the interior of a dwelling-house. In the same year, Mr. George Jennings patented the 'monkey' closet, now known in an improved form as the 'wash-out.' The object of the inventor was to combine in one piece of earthenware a closet, offering some of the advantages of the valve-closet, together with the simplicity of the hopper, without the disadvantages of either. This closet, which was considered a great improvement upon the 'old pan' and 'hopper' was at first much used, but it was soon found to be defective, as the excreta remained floating in the trap beneath, instead of passing through it at once to the drain; it therefore became very offensive, and although repeated attempts were made by the inventor to remedy the evil, he failed to do so, and in consequence ceased to recommend them. During the past few years, other inventors have taken this closet in hand, and, by the aid of improved flushing arrangements, have produced a better apparatus. The advantage of the improved 'wash-out' is, that without the aid of a valve, a large surface of water is held in the basin to receive the excreta, which is effectually washed out into the trap beneath, from which it passes to the drain. It has also the great advantage of being adapted for the discharge of slops. It, however, still retains some of its old faults. The flow of water which washes out the basin loses much of its force before it reaches the seal of the trap, and is consequently not heavy enough to clear the trap with any degree of certainty. Another objection is, that the shaft between the seal of the trap and the basin, which is mostly out of sight, becomes very foul, and emits offensive odours. It was to remedy the sluggish action of the flush upon the trap that the plug valve closet was introduced in the year 1858. This apparatus has enjoyed a large share of public favour, one of its principal

* Read at the Sixth Congress of the Sanitary Institute, Glasgow, September 1883

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recommendations being the freeness with which the contents of the basin pass away out of sight when the plug is raised. It is certainly an improvement upon the discarded 'monkey,' but experience has shown that it does not come up to the requirements of a good wholesome closet. The contents of the basin, which glide away so easily, frequently do nothing more than force out from the trap beneath what was left from the last discharge, the present one remaining, to be, in like manner, disturbed by the next visitor. As a consequence, offensive odours are generated, which, passing up through the hollow plug, cause much annoyance, and, perhaps, in some cases, danger. Again, the plug itself becomes, in a very short time, coated with filth, both inside and out, and emits a great stench, while the plug shaft quickly furs, and likewise smells badly. For the discharge of slops this closet is very unsuitable. I have frequently seen the hollow plug completely choked from this kind of usage. In fact, so much mischief has been caused in this way that some manufacturers have found it necessary to issue printed instructions in reference to it. To prevent gases passing up through the hollow plug, trapped overflows have been introduced; but where slops are discharged I cannot look upon this as a great improvement. The inconvenience and annoyance caused by the chokage of traps beneath 'plug' valve closets lead to the introduction of the so-called 'trapless' closets. This is, in my opinion, a desperate remedy for the evil.

Given a properly trapped and ventilated drain, a soil-pipe thoroughly ventilated at head and foot, a short-arm from basin to soil-pipe, a basin always fully supplied with water, and a water-tight valve, and some kinds of 'trapless' closets will act exceedingly well, leaving nothing to be desired. Now it is very important that the fact should be borne in mind that the advocates for these closets insist upon these conditions being carefully complied with, otherwise they do not recommend them. By skilful workmanship you may insure the first four conditions, but no amount of skill can insure the last two; and yet the temporary failure of either of these must result in the immediate admission of bad air to the house, its quality depending upon the state of the soil-pipe, while the state of the soil-pipe will depend upon the purpose for which the w.c. has been used. If it has been used as a urinal or slop-sink, the pipe must become very much fouled, and consequently the air drawn through will be very offensive. Now I can understand the reason for wishing, if possible, to dispense with the trap from under a plug-valve closet, because of its liability to choke and retain foul matters; but why the 'Bramah' pattern valve should be fixed without a trap I cannot understand, as the direct action of its flush carries all clean out through the trap at once, if a round pipe trap be used, and as this trap is ventilated direct from the top of the outgo, the air in the arm beyond is quite as pure, and probably more so, than with a trapless closet. It will therefore readily be seen that to a round pipe trap beneath a 'Bramah' there can be no objection, while it has the great advantage of permanently shutting off all communication between the house and the soil-pipe.

To be rightly considered wholesome and adapted for general use, a closet should, in my opinion, possess the following qualifications:—1. The water seal of its trap should be in sight, should stand up in the basin, and be quite safe from either momentum or syphonage. 2. It should be so thoroughly flushed that at each discharge every part of the basin and trap would be properly cleansed. 3. It should be as well adapted for the discharge of slops as for a W.C. A closet possessing these advantages is perfectly safe to use anywhere, and the only kind which, in my opinion, comes up to this standard, is that known as the 'direct action.'

Within the last few years several inventors have turned their attention to the manufacture of this kind of closet, and there are now several in the market to choose from, each of which has some advantage peculiar to itself. During the past four years I have tried several of these closets, by fixing them one at a time, for several months at my own house, and carefully watching their action; also at scores of houses where I have introduced them, and from the information thus gained I find—1. That these closets, when properly trapped, flushed, and ventilated, are perfectly safe and wholesome, and are free from the evils and annoyances attendant upon most other forms. 2. That to ensure a thorough flush out, the water must fall with an avalanche-like action direct upon the surface of the water in the basin. 3. That those basins which show an O. G. section are more readily flushed than those which have sides in the form of inclined planes. 4. That with a suitably shaped basin two gallons of water, delivered in five seconds, will thoroughly cleanse the closet. 5. That the ordinary round P or half S trap should never be used beneath these closets, because no reliance can be placed upon the safety of its seal. 6. Care is required in fixing these closets to ensure adequate ventilation to the trap, because, owing to the exposed portion of its seal, it is liable, unless so guarded, to be destroyed at any moment by the discharge of a pail of slops; but, if properly protected, it is quite safe from this action. Where the position is such that this necessary protection cannot be given, on no account should a 'direct action' closet be used. It is better, under such circumstances, of the two evils to choose the least, and fix a good 'Bramah' pattern valve closet and D trap.

One word with respect to closet seats. It is the prevailing fashion to have them to fit as closely as possible, and to keep the lid shut. I think this is a mistake. If there are any gases to escape, they should be allowed to do so at once, rather than be kept boxed in, ready to belch forth into the face of the next visitor. For this reason, I would discard lids altogether, and, provided a suitably finished apparatus could be introduced, the riser also, and allow the floor cloth to run right under the seat, leaving no space in the room where bad air could be detained. The answer to a question which is frequently asked, and which very naturally arises in the public mind, viz., How is it that while the same state of things has existed for many years, it is only comparatively recently that 'sewage gas,' 'pan closets,' and 'D traps,' have come to be considered such dreadfully mischievous things? My answer to this is, that the arrangements of our houses with regard to health, are very much influenced by what the doctor says. Now it is a fact, that, up to a certain date, doctors, as a rule, did not recognise the evils of sewage gas, and, consequently, little attention was paid to it. It was a nuisance to be got rid of as much as possible, but water-closets and sinks were expected to be rather offensive, and the idea was seldom entertained that the annoyance could be avoided.

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The illness of H.R.H. the Prince of Wales, in 1871, drew the attention of the medical profession very pointedly to the poisonous nature of sewage gas, and, at the same time, it aroused the public mind to the immense dangers of its deadly influence, and, as a result, the ranks of those eminent sanitarians, who had been long striving hard for sanitary reform, were soon swelled, and now, throughout the land, the medical profession—who financially have all to lose, and nothing to gain, except improvement in the general health—are coming forward, and doing their utmost in the cause of sanitation, and telling us that we might be more healthy if we would.

THE TREATMENT AND UTILISATION OF TOWN REFUSE.*

By JOHN COLLINS, F.C.S., F.G.S., &c.

THERE can be no doubt that the disposal and utilisation of effete and offensive town matters, as derived from middens, cesspools, &c., forms one of the most difficult as one of the most important problems with which we have at present to deal. For while the modes of treatment and of disposal may not be too technical or too expensive, the work must be thoroughly done; and in such a way, too, as to cause no nuisance or damage. In large manufacturing towns, where action is most needed, the problem is necessarily most difficult.

It is not proposed by the writer to deal in any way with sewage, properly so called, but with such towns' refuse as is commonly found in the endless variety of substances in cesspools, midden heaps, excretal refuse, market and other garbage.

The depôt or works for dealing with these should be as central as may be, and must have the necessary aids to cheap and rapid transport offered by rail or canal, or both. The arrangement of plant, &c., must be simple and not liable easily to get out of order, or to suffer from indifference or mismanagement. The process of utilisation must also be rapid in the disposal of what are really offensively disgusting and in many cases dangerous matters. The means of transport must provide an outlet into an agricultural district which shall be handy for application and consumption at low rates.

Without going into the means adopted to secure these ends in other places, the town (Bolton) in which the writer practises affords, as he believes, an illustration—as advanced as may be found—of a mode of cheap and thorough disposal of effete town refuse; and it is the main purpose of this paper to lay before the Congress the means whereby this is effected and to what extent.

The population of Bolton is about 106,000. The midden and open cesspool prevails, although there are a few water-closets, and a considerable part of the newer cottage property is provided with 'pails.' The collection and scavenging of these is mainly effected in the night, and by means of closed carts of excellent design. These matters are roughly assorted on loading. Dry ashes from fires and furnaces only are taken and 'tipped' outside the town. All other matters are carted to the works, and are again sorted on their arrival. When needed they are deodorised. They are all immediately dealt with, and no accumulation is permitted. The drains and sewers therein are all disconnected with the town system, and their contents are dealt with in the works.

The materials brought to the yard works may be described generally as domestic and market refuse and street sweepings. It contains cinders, coal, ashes, brickbats, glass, crockery, mortar, old carpets and shoes, paper, rags, bones, cabbage stalks and other vegetable refuse, sound and unsound, entrails of birds and fish, manure and fæcal matters, oyster shells, dead kittens, old meat tins and pails, bottles and jars in earthenware and in glass, old iron, &c.

On arrival, this is variously dealt with. The comparatively dry ashpit refuse is assorted, and part is ground with fæcal and other effete matters into a manure of a dark grey colour, inodorous and pulverulent, and having little about it to suggest its origin. This manure is at once sold to the farmers, or it is stacked in the staiths specially provided for it, until the season arrives when it is required. No nuisance, nor even smell, is due to or is caused by this stacking.

Another part is charged to the 'Destructors' (Fryer's), where it is burnt, leaving only a residuum of 'clinker' and of ash, which is, in its turn, used for making a capital mortar and cement, and for road making.

In this way the whole of the 'refuse' is daily dealt with immediately on its arrival, and it is in no case permitted to remain to become the nuisance and danger to health it would otherwise surely become.

Were the burning carried on in open heaps, or in openly constructed furnaces, it would probably be found to constitute a very serious and dangerous nuisance. But here, the furnace is specially designed, and no such result can arise. It is self-sealing, and is connected with a chimney shaft 180 feet high, with a mean sectional area of 49 square feet, and a mean draft of 107,100 cubic feet per minute. The quantity of 'smoke' is very small, and has the faintest disagreeable odour. It is mainly watery vapour.

A fine dust is one of the results of this 'destruction.' It is lightish grey, caustic and absorbent. It is inodorous, and not in any way more offensive than is ordinary flue dust.

The 'clinker' and ash are absolutely inodorous and inoffensive.

There is necessarily an occasional smell of fæcal matters in the works, but this is not more than would and does occur in the daily use of and in the occasional emptying of the old privy provided in the back yard of each cottage, and it cannot be said to constitute an injurious nuisance. The albumenoid ammonia supplies a measure of the nitrogenous organic bodies and putrescible matters, or of the sewage contamination of the atmosphere. It is always an ingredient in bad air, and it is rarely, if ever, absent in the air of all town dwellings. It is not here in quantity to be noxious and injurious.

When manufactured and stacked, the manure has been carefully watched, to ascertain if any 'heating' from storage or further decomposition occurred. But the stock is almost inodorous, and is certainly not offensive, for it cannot be detected at a distance of twenty yards. After intimately dividing and mixing the ingredients, decomposition is stayed, and the gases are fixed, to be liberated only by the growing plant when applied in agriculture. The ammonia and other nitrogenous matters are intimately combined and admixed with carbon

* Read at the Sixth Congress of the Sanitary Institute, Glasgow, September 1883.

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and other finely-ground absorbents, and hence no offensively-smelling gases are evolved. A sample of this manure has been in the writer's laboratory open and under ordinary conditions for over twelve months, and is now free from smell.

The temperature of the stock is very steady, at about 60°–61° F. Hence no decomposition is going on in the mass, for this would produce heating. The moisture in the ashpit refuse is usually about 10 per cent., and the whole of this water is vaporised in the 'Destructor.'

It is not within the province of the writer to give the costs of this mode of disposing of town refuse; but it will be seen that it must be economical, as it is effectual. No attempt is made to 'manufacture' a high class 'guano' or other manure. The first object aimed at is the getting rid of an evil; the next, how to do this cheaply and effectually. It is believed this is done in the case here described; for the ordinary means for collection and removal are sufficient and ample. The plant for dealing with the matters is simple and economical, and the results are merchantable and find ready sale. Much is disposed of as made, and of the remainder the stock disappears in a few days when the season for its application arrives. It does not pay expenses, of course, but it costs less, it is believed, than any other plan in operation on a similar scale.

The superintendence and laying out of the works and plant, and the general success of the process adopted, owes much to the close attention and the indefatigable oversight of his worship the Mayor of Bolton, E. G. Harwood, Esq., and only in a less degree to the committee over which he presided, and which had charge of this department.

THE SCAVENGING OF TOWNS.*

By JOHN YOUNG, Inspector of Cleansing, Glasgow.

SCAVENGING is a subject of vital importance, and it has unquestionably a most direct bearing upon the health and comfort of the inhabitants of large towns and cities; I therefore present a few observations from my experience in Glasgow, and shall first of all give a short sketch of the work of the cleansing department of this city as at present carried on by the magistrates and council.

It may be well to premise that the present population of Glasgow, upon an area of 6,034 acres, is estimated at 531,200; and the assessable value is 3,425,646*l.* The general cleansing of the city, although under one management, is reckoned under three sections, viz. (1) Domestic Scavenging, or Night-soil and Refuse Removal; (2) Street Scavenging; and (3) the Scavenging of Private Courts or Back Yards.

Reversing this order I shall take:—

I.—THE SCAVENGING OF THE PRIVATE COURTS.

In this branch of the work we have 218 men, including foremen, employed daily. Their working hours are from four in the morning till nine, and from half-past ten till half-past three. The city is divided into six districts, and these into eighteen sub-divisions. The sub-divisions are again divided into beats, and each man has his own beat to scavenge. All the closes or entries and courts by or to which more than one tenant has right of access are swept daily once, twice, or thrice, according to their requirements. Eighteen of the men are constantly employed scouring the dirtier courts and closes with hose, which they attach to the street fire-plugs. The staff also includes public urinal cleaners and ashpit limewashers. The total sum spent under this heading is, in round numbers, 10,000*l.* a year. To meet the expenditure for Cleansing Private Streets and Courts, the Glasgow Police Act authorises the levying of an assessment not exceeding 1*d.* per *l.* upon all property bounding with or having right of access by or to any private street or court. I may mention here that all the scavenging under the two following heads is paid for out of the general Police Rates.

II.—STREET SCAVENGING.

The total lineal measurement of streets and roads within the city boundary is 153 miles. In this section 175 men are employed, including foremen; and we have sixteen horse-drawn sweeping machines. The street scavengers are stationed under the same districts and sub-divisions, and work the same hours as the court scavengers. The horse-brushes are worked during the night, starting at eleven o'clock. For scavenging purposes we have first, second, third, and fourth-rate streets. All the first, or principal streets, are machine-swept every night, and the second and third less frequently, according to their requirements. The fourth-rate streets are, as a rule, those which are paved with rubble or undressed stones, and are swept by hand-brushes. The principal thoroughfares, which are swept every night by machines, are also picked, and the channels swept by hand-brushes during the day. Our latest improvement in this connection has been the introduction of a registered street-bin for the deposit of the droppings picked up from the principal streets. This bin is sunk flush with the foot pavement—the frame forming part of the kerb—so that it is no obstruction whatever. It is chiefly on this account that I consider them so much preferable to pillar-bins, such as are used in London. The amount we expend upon street scavenging and watering (exclusive of the removal and disposal of the scavenge) is, in round numbers, 12,000*l.* a year.

III.—DOMESTIC REFUSE AND NIGHT-SOIL REMOVAL AND DISPOSAL.

(I may explain here that the carting and disposal of street scavenge is embraced in our accounts under this head.)

In this section of the work 240 men, including foremen, are employed, and a stud of 175 horses, with the usual relative plant, which in our case includes 600 railway waggons for carrying the city refuse to the country. On the average for the year 700 tons of manure and refuse are dealt with daily; and I may mention here that the cost of this section, deducting revenue from expenditure, is, in round numbers, 21,000*l.* a year.

In explaining our method of dealing with the city refuse, I shall first speak of its *collection* and afterwards of its *disposal.*

In regard to the collection, I may say that we have tried several modes by way of experiment, but the two systems which may be said to be in operation in Glasgow are the morning-cart or bell-cart system, and the ashbin or ashpit system. The former is in operation chiefly in the centre of the

* Read at the Congress of the Sanitary Institute, Glasgow, September 1883.

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city, where the properties are principally occupied as shops and warehouses. As a rule fixed ashbins or ashpits have been abolished in the districts overtaken by the bell-cart. The great bulk of the domestic refuse of Glasgow, however, is collected from ashbins or ashpits. The most of these places of deposit are now small and improved in construction. As a general rule they are emptied once in eight days. In the denser parts of the cities, however, many of them are emptied daily, and others twice or thrice in the week, while in the less densely populated districts, especially where there are lanes running behind the properties, the intervals are much longer. The most part of the ashpit contents is removed by the staff working during the night between the hours of 11 P.M. and 9 A.M. Any portion removed during the day is taken from ashpits abutting with the lanes. As to the excrementitious matter, I may state that of late years water-closets have been largely adopted in dwelling-houses in all parts of the city, so much so that the larger portion of the excrement is disposed of by water carriage. We have, however, 3,155 pail closets in connection with dwelling-houses, and 1,268 in connection with workshops, factories, &c. A large proportion of the pails are removed in covered vans on the exchange-pail system, and we are extending this system of removal as far as practicable. Then, to tell the whole truth, we have still a remnant of the old system of privy and ashpit combined, but these will soon be abolished, and the sooner the better, as, laying aside the question of health, there is no means of emptying such middens without creating an intolerable nuisance.

The *disposal* of all the various classes of refuse collected in the city is the most serious task of the cleansing department. Scotch farmers, as a rule, prefer bulk manure, when it is available, to chemical manures; that being so, we endeavour to place our city manure within the reach of as many of them as possible. The result is that we supply city manure to 2,400 farmers whose holdings are situated over fourteen different counties. Until recent years our system of mixing and dispatching refuse was rather primitive. We have now, however, erected city dispatch works at St. Rollox, in the northern district of the city, and other works of a similar kind are in course of erection on the south side of the river, good railway connection having been secured in each case. These works are thoroughly enclosed, and supplied with machinery and apparatus for dealing with the various kinds of refuse. The soil-carts are taken to the upper floor where the fæces are emptied into air-tight cast-iron tanks. The ordinary refuse is also taken to the upper floor, whence it passes down through a double acting revolving screen. The finer ash passes, or is carried, into a mixing machine along with a mechanically regulated quantity of excreta. Some street sweepings, after being treated as I shall explain further on, are also simultaneously shot into the mixer, and thus a prepared manure—in a great measure deodorised and free from all hard rubbish—is passed mechanically into the railway waggons. The full waggons are at once dispatched to supply farmers' orders, or, failing them, to a yard twelve miles distant, where the manure is temporarily stored for the supply of future orders at such times as the daily supply falls short of the demand. Thus the necessity for storing refuse within the city is got rid of. The cinders taken from the domestic refuse are more than enough for raising the necessary steam for the works. [I may mention that the Committee on Cleansing have had before them for some time the question of utilising the surplus cinder fuel in raising steam for electric lighting purposes, and at the present time a special joint committee has been appointed to report on the subject.] The rougher rubbish, which is delivered at the lower end of the revolving screen, falls upon an endless web, which travels at the rate of 25 feet per minute. Women are engaged picking from it, as it passes along, anything which can be utilised or sold. Garbage and dirty straw, for instance, go for manure; solder is extracted by a special furnace from the old meat tins; the tins, as they come from this furnace, as also old iron, old boots, &c., are sold. The remainder is delivered on the top of the cremating furnaces, through which it is passed, and the residuum, drawn therefrom in the condition of slag or clinkers, is used for road making or filling up hollow ground. The foul air from the soil and mixing chambers is exhausted by means of a powerful fan, and conveyed under the bars of the cremating furnaces. It is thus purified before passing into the chimney, while, at the same time, it serves as a blast for the furnaces. Noxious odours are thus prevented escaping from the building. At the South Side Works special attention to this is being given. The exhauster will be still more powerful than the one at St. Rollox, and the pipes will be led under the furnace bars there also. But, in order to secure more thorough ventilation of the whole building, and also for light, we are forming a well, by leaving an aperture in each floor, 31 feet by 22 feet in the centre of the three-storey building, and a 3-feet pipe will be led from the roof immediately above the well to the chimney. This stalk is 250 feet high, and is constructed with an inside chimney to the height of 60 feet, thus forming an annular chamber, about 2 feet wide, into which the ventilating pipe referred to will be led.

Another new feature in these works will be a suite of baths, for the use of the *employés* in the works and also the street and court scavengers of the district.

This sketch would not be complete without further reference to our mode of dealing with the street sewerage. It rains very frequently in Glasgow, and one of the consequences of our uncertain climate is that a very large and ever varying quantity of sweepings—often slushy—has to be removed from our streets. What we have aimed at is to make provision at our Refuse Despatch Works for having all the street sweepings quickly disposed of along with the domestic and other refuse. For this purpose we have adopted a series of patent slush-tanks with sloping bottoms. In these tanks the water is rapidly forced to the surface by the downward pressure of the material upon the slope, and is drained off by means of the little slide plates in front of the tank. By this means, in the short space of twenty-four hours, soft slush from the paved streets is rendered solid enough to be despatched by rail along with the other manurial refuse. The sweepings of macadamised roads are drained in the same way. They are not, however, mixed with the saleable refuse, but are sent on to Fulwood Moss Farm, ten miles distant. This is a farm of about 100 acres, which the magistrates and the council four years ago leased for thirty-one years. At that time it was a heather bog, but it has now been thoroughly drained and reclaimed; and, with the application of road scrapings, yields good crops.

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A considerable part of the reclamation was done by the unemployed poor in the first months of 1879.

Such are the general arrangements of our cleansing department. It is not to be supposed that I consider them perfect, but we are earnestly endeavouring to advance with the times, and to meet the requirements demanded by sanitary science, experience, and common sense.

In regard to town scavenging generally, although there are points upon which a rule might be laid down for general application, it is quite obvious that the *modus operandi* must be determined in each case by local circumstances,

Speaking generally, there are two great preliminary provisions without which *no* town can be efficiently scavenged, viz. :—(1) Proper sewerage, and (2) suitable surfacing. In regard to these I do not think Glasgow suffers by comparison with other cities. The foundation of efficient cleansing lies, like other foundations, under the surface, and no town can be properly cleansed until it has been properly sewered. Nothing can be more obvious than this, unless it be the necessity for this first provision being followed up by its natural companion—a well-paved surface. I have always considered macadam very unsuitable for heavy street traffic. It is certainly very troublesome to a cleansing department, as in our climate a macadamised street is almost invariably disagreeable either from mud or dust. I agree with those who are of opinion that a street for bearing heavy traffic should have a good foundation of concrete to begin with, and whatever may be the material laid above it, whether stone, wood, or other finishing, the surface thus formed should be rendered impervious by having the interstices grouted with cement or pitch. Such a street is easily scavenged.

I also attach great importance to the surfacing of back courts or yards. To have them laid either with well-jointed flags, asphalte, or other impervious surfacing, which will admit of regular and thorough hose washing, is, in my opinion, absolutely essential to their efficient cleansing as well as to health. For this purpose undressed stones laid in ashes are very objectionable. The interstices become almost immediately grouted with filth, and hose washing of such a surface only makes bad worse. I have great faith in hose washing, much more than in so-called deodorisers and disinfectants. In order to carry out this view I might add a third essential to efficient scavenging—viz., a liberal water supply; and I should stipulate for a plug in each court for hose-washing purposes. With these provisions the scavenging of streets and courts in any town is simply a matter of good organisation and sustained attention.

It is in the collection, removal, and disposal of the general town refuse that the special circumstances in which they find themselves placed must guide corporations. Human excrement, while being the most valuable constituent of town refuse, is at the same time the most difficult to deal with. How to dispose of it is therefore the first question we have to consider. The filthy old system of combined privy and ashpit we put aside as being quite out of the question. I take it that if this material is to be retained for manurial purposes it should be collected and removed in receptacles separately from the ordinary refuse; I am therefore led to compare the pail system of collecting with the view to its utilisation as manure, with the water-carriage system, which gets rid of it by flushing into the sewers. It is natural for one who is entrusted with the sale of city manure to be desirous of retaining the material which forms its chief value. Being in that position I have been very unwilling, and am still sorry to see it lost in the sewers. But being at the same time an officer of a health department, I must look at the question all round, and the more carefully I do so I become all the more fully convinced that water-carriage should and will prevail. That it is more comfortable and cleanly must be granted. In regard to the requirements of health, care and attention are necessary in either case. The situation of a water-closet, and its condition as to light, ventilation, and traps, are of course the salient points. On the other hand, the chief point in a pail closet is that the contents be removed before they ferment or decompose. In either case the necessary conditions are, I believe, quite within the range of practicability.

Whether collection by the pail system will show better financial results than flushing into the sewers, must depend on the conditions of removal which are to be considered necessary for health. If these conditions were fulfilled by the old system of simply emptying the pail contents into the passing soil-cart, the financial policy of collecting it from the rears of dwelling-houses might be upheld. The case is quite altered, however, if we consider it necessary to have all used pails removed bodily in covered vans, say twice a week, and clean pails put down in exchange. This would mean the removal of pails with only a trifling quantity in them, and the expense in that case would exceed any price which could possibly be obtained for the material as manure. I therefore conclude that the water system is more economical for dwelling-houses than a twice-a-week exchange pail system.

In the application of the water system to dwelling-houses in block tenements, where one outside closet serves a number of families, I believe trough-water closets, with the flushing arrangements under the control of the scavenging department, will prove the best. One very important point in favour of using water in such cases is that it admits of a more liberal number of seats in proportion to the families, whereas, with the exchange pail system there is the inducement to cause as many families as possible to use one seat, in order to have a quantity worth taking away in the pail at each removal. Such a restriction must inevitably lead to a great amount of discomfort, more especially on Sundays, when, as a rule, all the members of a family are at home. For workshops, factories, and such places, however, where large numbers of workpeople are brought together, the pail system can be so regulated that, without inconvenience, the pails would be reasonably well filled at each removal. This being so, and seeing the excreta is of so much value to us in Glasgow in helping away the general refuse of the city, I have always recommended the pail system of collection from as many workshops as possible, when the closets are on the ground level.

The points which now remain for consideration are the collection and ultimate disposal of the general refuse. We all know that the more frequently refuse is removed, the better is it in a sanitary or health point of view. With regard to the mode, I think any system of collection which leads to or tends to encourage the keeping of refuse for any time inside of dwelling-houses should be guarded against. This is the chief objection, I see, to what

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is known as the bell-cart system if applied to dwelling-houses, especially smaller houses which have no inside water-closets. The bell-cart system suits very well for shops and business premises, and for its proper working uniform dust boxes should be used. But in my opinion it is desirable that provision be made in connection with dwelling-houses whereby the occupants can carry out their refuse at any time. In a town of self-contained dwelling-houses, each having its own back-yard, I consider the portable box system, each box having a shed roof over it, very suitable. The circumstances are quite different, however, in a city like Glasgow, where all the working classes, and in point of fact the great majority of the inhabitants, live in large tenements in several flats, with several houses on each flat. In that case one back court or yard is common to and used by a large number of families. We have 20, 40, 60, 80, and even 100 families using the same court, and it must be remembered that the back court is very much the children's playground. It is quite obvious that to have under these circumstances as many portable boxes placed in the court as would contain even one day's refuse from so many families would be out of the question. I know its weak points, but still I consider that a well-formed and proportioned ash-house in the court is on the whole the best arrangement for such tenements. It should in any case have good ventilation. The floor should not be under the level of the yard, and it should be cemented inside. The door or opening should be large enough to admit of the refuse being easily thrown in as well as easily taken out, and the bottom of the opening should not be more than 30 inches high. The capacity of the receptacle should be regulated according to the number of families requiring to use it.

The question of ultimate disposal of city refuse must also, as in the case of collection, depend upon local circumstances. The refuse of a town whose excrementitious matter is all disposed of by water carriage cannot be said to be of great intrinsic value. Its practical value, however, as in the case of other goods, is what it will bring. We know that towns which command large tracts of agricultural land may, and in point of fact do, get money out of manure of a quality inferior to that which other towns, differently situated, are compelled at considerable expense to destroy. In any case, however, there is the furnace to fall back upon. When the supply proves greater than the demand for manurial purposes, the supply can be curtailed by burning the worst of the material, and just as the demand decreases the burning power must increase. How the heat produced in the cremating furnaces can be most profitably utilised is, therefore, a question worthy of earnest consideration. I have no doubt some large seaport towns, where barges can be safely used for carrying the unsaleable refuse out to sea, will find this the cheapest and best mode of getting rid of it; but comparatively few towns are in this position.

It was very aptly said by one of our great men that 'dirt is matter in the wrong place.' The task of health departments and cleansing masters is to discover the right place for it, and having arrested it in the very act of going wrong, to put it where it ought to be. This, however, like many other things, is 'easier said than done.'

REPORT OF THE PROCEEDINGS AT THE SIXTH CONGRESS OF THE SANITARY INSTITUTE OF GREAT BRITAIN.

Held at Glasgow, from Sept. 25 to Sept. 29, 1883.

THE Sanitary Institute commenced its sixth autumn Congress and Exhibition at Glasgow on Tuesday, September 25, under most auspicious circumstances. St. Andrew's Hall, Granville Street, was kindly placed at the disposal of the Council by the Lord Provost of Glasgow, and here the proceedings of the Congress were carried on. On the 25th a public luncheon was served, at which the Lord Provost and other members of the Corporation were present, and immediately afterwards the party proceeded to the Exhibition building in the Great Western Road, where his lordship, with some appropriate remarks, declared the Exhibition open. The party then went through the building, and appeared to take particular interest in many of the exhibits. At 8 P.M. the first general meeting took place, when the inaugural address was delivered by Professor G. M. Humphry, M.D., F.R.S., President of the Congress, to a large and attentive audience; an abstract of it will be found at page 149.

SECTION OF SANITARY SCIENCE AND PREVENTIVE MEDICINE.

ON Sept. 26 Professor Gairdner delivered the presidential address in this section, of which the following is a summary.

THE PREVENTION OF DISEASE.

Professor GAIRDNER said that prevention of disease, the great object of modern sanitary science, had too often been regarded as unprofitable, not merely in the coarse sense of being unremunerative, but also because the inquiry into causes belonged for the most part to the class of speculations condemned by the inductive philosophy as destitute of fruit, and therefore wholly insecure and unpractical. Up to the very beginning of the present century the attention of physicians was but feebly attracted by sects and doctrines, which, had sanitary science existed in any real sense, could hardly have failed to become generally accepted. That it should have taken two centuries to reduce to a practical rule in the navy of Great Britain the measure by which Commodore Lancaster saved his crew from scurvy in 1603, was one of those facts which could not be got over, and which showed that in a practical sense preventive medicine and the effective study of the causes of disease were things of yesterday as compared with the ages of effort, not wholly unsuccessful, devoted to the cure of diseases. Professor Gairdner went on to speak of the enormous debt which sanitary and medical science owed to the late Dr. Farr, who gave an impulse to preventive medicine and sanitary science, amounting almost to the discovery of a *novum organum* for it; and was in the end obliged to retire from his work on behalf of the nation with so little of what could be called national recognition of his vast labours and eminent services to the State. He suggested the republication of Dr. Farr's works as the best of all possible monuments to his memory. It was a strong sense of the imperative necessity of maintaining the connection between curative and preventive medicine that led, more than anything else, to his own acceptance in 1863 of the office which alone gave him any claim upon the attention of the Congress that day. As a teacher of the practice of medicine already of some experience, and recently appointed professor of that subject in the University of Glasgow, he was invited by the authorities to assume the responsibility of the sanitary administration of that great city as its medical officer. He was assisted in the work by Dr. Russell and other devoted

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officers. During the period he held the post, from 1863 to 1872, several considerable epidemics had been dealt with, and these revealed very clearly the weak points of Glasgow sanitation according to the means and resources which then existed. As these various epidemics had revealed thoroughly the city's weak points, there was, on the other hand, room for congratulation on their comparative immunity as regarded two diseases which during his term of office had given rise to a very large epidemic mortality throughout the country. One of these was cholera, which became epidemic in London in the summer of 1866, and in the autumn and early winter spread very extensively over England and Scotland, causing an especially large proportion of deaths in Leith and in some of the smaller towns and villages on the east coast of Scotland. In reporting on that subject on the last day of 1866, he was able to show that, notwithstanding their terribly degraded and over-crowded population still living under the scourge of a previous severe epidemic of typhus, they lost only one in 10,000 of the inhabitants from cholera in the four months August to November 1866, against 7·5 in Edinburgh, 6·2 in Dundee, 7·2 in Aberdeen, 2·5 in Greenock, 5·4 in Perth, and no fewer than 24·4 in Leith. Nor was this because the epidemic influence was wanting, for during the same period more than 700 cases of diarrhœal disease were reported, and carefully investigated at the sanitary office, 108 of which had more or less resemblance to cholera, and were indeed considered as being in all probability cases of that disease, though often in a milder form. The city's comparative immunity was universally attributed, first, to the all-important fact of its having a perfectly pure water supply, and, secondly, to the elaborate arrangements made, under the sanction of the Magistrates' Committee, for dealing with the individual localities and persons affected in the way of cleansing, disinfection, isolation, &c. Professor Gairdner also referred to the outbreak of small-pox in 1871, and the marked check which sanitary preventive measures had upon it. He asked why they were not able to grapple with equal success with outbreaks of typhus and relapsing fever. He believed the reason was not that these diseases were essentially less amenable to preventive medicine than cholera or small-pox, but because the machinery with which they had to work was wholly inadequate to grapple with their causes. In Glasgow they had long suffered, and in the decade referred to they had suffered in a very high degree from fevers caused by overcrowding, with grave destitution superadded. The Professor went on to describe the overcrowded state of many parts of Glasgow at the date when he entered upon office, and the powers which were conferred by legislation for dealing with that cause of disease, and also of grappling with epidemics. He held at that time that in endeavouring to suppress typhus fever they were merely scratching the surface so long as the houses, well called 'rookeries' or 'warrens,' were allowed to exist unreformed. Two of these rookeries, as early as July 1863, were singled out for experiment. The powers obtained under the Police Act for dealing with overcrowding came gradually into operation in many parts of the city, so that before August 1864, he was able to report upon 6,360 houses or individual holdings, mostly single or double apartments, as being under police regulation—'ticketed houses,' the occupation of which was subject to be ascertained by domiciliary visits of the police, and was supposed to be regulated in accordance with the provisions laid down in the Act. Further progress was made in succeeding years, and subsequently the late Provost Blackie, in conjunction with Mr. John Carrick and other well-known and philanthropic minds, devised the now famous, and, he believed, really most effective City Improvement Act, to sweep away, but not so suddenly as to give rise to great inconvenience, a large number of the closes and wynds where the worst sanitary features existed, and where, at the same time, there was a prospect that after the clearances a better class of houses might probably take the place of those removed. The administration of the Act had been much canvassed, and even unfavourably criticised in detail, but that it had very greatly diminished the hold of epidemic disease in the parts of Glasgow which it affected no longer admitted, in his opinion, of any reasonable doubt. In the course of some further remarks, Professor Gairdner observed that from subsequent facts and observations it became probable that not only as against zymotic diseases, commonly so called, but also as against those inflammatory and even those chronic affections of the lungs, which formed by far the largest factors in the city death-rate, the true preventive medicine was to be found chiefly in improvements directed towards the ventilation, cleanliness, and general comfort of the houses of the poor, and that overcrowding and overbuilding of ground space especially were to be corrected, not only as conducing to typhus fever, but to many other diseases.

Dr. CARPENTER assured Professor Gairdner that his suggestion as to Dr. Farr would be considered by the Council of the Sanitary Institute, who, he was sure, would be ready to entertain it.

CHOLERA EPIDEMICS AND TYPHOID FEVER.

Dr. JAMES CHRISTIE, Hillhead, read a paper on the subject of 'Cholera Epidemics: their Etiology, Modes of Diffusion and Preventive Measures, with special reference to Quarantine.' The writer pointed out in the course of his paper that the worst mode of meeting an epidemic of cholera was to wait till it reached us, and then to fight it; but the best plan was to render an epidemic of cholera impossible. This could be done with comparative ease, the chief difficulty being in moving Government and local authorities. The public measures for the prevention of cholera were measures equally necessary for the promotion of the public health, and for the promotion of public morality. With a pure water supply, uncontaminated between its source and distribution, a great outbreak in a community would be impossible. With a reasonably careful mode of excretal disposal the risks would be greatly lessened; while, with complete cleanliness all round, solitary cases only would occur. The only possible benefit that could result from a rigid system of quarantine would be the touching of the public conscience through the public purse. The interruption to the commerce of India might stimulate sanitary research and sanitary reform in India, and nothing more. It would be proper, however, to place every vessel in quarantine that had cases of sickness on board; and the necessity for doing so could be determined by inspection. We should do with a ship and its crew and passengers what we do with a house and its inhabitants in a crowded city. A *cordon sanitaire* should be placed round the sick in an hospital specially adapted for cholera patients; and the well should be placed in quarantine in a well-appointed reception-house. Meanwhile the ship should be thoroughly cleansed and fumigated, after the manner of house disinfection. By applying the *cordon sanitaire* and quarantine in this manner, both in respect to people on shore and on board ship, in Europe and in India, cholera epidemics would be strangled at their birth. Egypt and all other countries in an insanitary condition would be swept by epidemics of one kind or another, time after time; and it was quite proper that such should be the case. The sanitary system of the universe was perfect; its laws were inexorable; and it was ever true as regarded nations as well as man, that 'the soul that sinneth, it shall die.' There was no certain specific for the cure of cholera, and it was hoped that none would ever be discovered; but there was a specific for its prevention—viz., to have done with its haunts—filth. Neither was there any specific, such as quarantine, for the prevention of epidemics of cholera in any country, the only mode of protection being the removal of all insanitary conditions so as to render its propagation impossible.

Dr. J. F. SUTHERLAND, Glasgow, read a paper on 'Typhoid Fever; its Origin and Prevention.' What, he asked, were the changes needed in our sanitary codes

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which would be efficacious in extirpating this malady? It had been demonstrated as clear as noonday that typhoid fever was intimately connected with sewers, privies, and cesspools. All legislation, to be effectual, must put an end, as far as possible, to the possibility of these pollutions taking place. The sanitary area must be enlarged by adopting the county or combination of counties as the unit area of administration. All sanitary matters must in future be managed by a central authority composed of men duly qualified for the work. There must be a thorough reform of what had been termed the building regulations. These had reference to house construction, house drainage, size of rooms, and cubic spaces per head.

Discussion.

Professor De Chaumont said, with regard to the question of quarantine, it had been admitted that cholera germs were capable of being carried from place to place by human intercourse, and he held that quarantine regulations were absolutely useless. These regulations interrupted business and delayed travellers without doing any good whatever. A very interesting speech was made at the recent Congress at Amsterdam by a shipowner, in which the speaker pointed out the many difficulties which shipowners had to contend with, including those created by quarantine regulations. That shipowner said it was perfectly easy in any port of the world to get quit of the annoyance caused by quarantine regulations by the payment of 'backsheesh.' During the recent outbreak of cholera in Egypt, a sanitary cordon was drawn round Alexandria for the purpose of preventing trains, carrying for the most part cleanly persons, from entering the city, yet filthy Arabs were going about on foot, carrying the disease into the place. They were still in the dark on the subject of the spontaneous origin of typhoid fever, but the evidence went to show that mere sewage did not give rise to the disease. There were many instances of people drinking from polluted streams without their being attacked by the fever. They could only account for the spread of the disease by the fact that the poison, once it found conditions favourable for its propagation, spread among the populace. Sanitation was the fundamental point they ought to aim at, instead of futile attempts at quarantine and sanitary cordons. The drinking of impure water was favourable to the disease, but the best preventative was the removal of sewage from large centres, proper ventilation, and attention to personal cleanliness.

Dr. M'Gown, Millport, said that once a well got contaminated, those who drank the water were liable to be attacked by typhoid fever. He had lately investigated a case in which typhoid fever broke out in a family, and found that an impure well had been the cause of it. Wells about farm-steadings were liable to be contaminated, and the milk sent from these places into towns and villages was liable to cause disease.

Disabilities of Inspectors of Nuisances.

Mr. E. C. Robins, London, read a paper on 'The Disabilities of Inspectors of Nuisances and their Remedy.' (See p. 176.)

Discussion.

Dr. Naismith, Ayr, said that in small towns, with populations numbering from 10,000 to 30,000, the position of the inspector of nuisances was frequently very unsatisfactory. The person holding the office was usually a native of the place, who was only half trained for his situation, and in some cases he was allowed to engage in other occupations. It was a pity that by legislation, municipal or otherwise, such towns as he spoke of could not obtain inspectors trained in larger towns. An inspector ought not to be allowed to engage in any other occupation, and he should be removed from all direct authority except that of the medical officer who was his chief.

Dr. Simpson, Aberdeen, endorsed the views expressed by Dr. Naismith. The grievance might be worse in the smaller places, but it also existed in the larger towns. There was no more difficult position than that of a sanitary inspector, having to send notices of removal of nuisances and for the repair of houses to members of town councils. Human nature would belie itself if a town councillor receiving such a notice did not in some way have a feeling against the sanitary inspector.

Dr. Wright, Southport, mentioned a case in which, when a medical officer did anything to dissatisfy a member of the town council, the latter or some of his friends moved that the medical officer's salary should be reduced. Members could imagine the great annoyance to which the medical officer was subjected from such a course of procedure.

The Sanitary Condition of Glasgow.

Mr. Gilbert Thomson, C.E., submitted some 'Notes on House Sanitation in and round Glasgow.' (See p. 178.)

Discussion.

Professor James Thomson wished to know whether smoke or paraffin was the most effectual test.

Mr. Robins said he had never used the smoke test, but had found oil of peppermint mixed with water to answer very well. If anything, the smoke test had the advantage, as it could be both seen and felt.

Mr. Gilbert Thomson, in reply to Professor Thomson's question, said the smoke test was always preferable to the other, as it was visible, but the paraffin test was easily and rapidly applied. He had experienced very little difficulty in getting at the exact spot where a defect existed when using paraffin, as the smell could not be mistaken. The mode of applying it was to pour it from the top into the soil pipe or conductor.

Southport—The Danger which Threatens a Health Resort.

Dr. Wright, Southport, read a paper on 'The case of Southport; an Illustration of the Danger which Threatens the Existence of a Health Resort.' (See p. 171.)

In the evening a conversazione was given in the Corporation Galleries, in honour of the visit of the Congress, by the Lord Provost, Magistrates, and Town Council of Glasgow. Invitations to the number of nearly one thousand were issued. The proceedings were of the most agreeable character.

Section of Engineering and Architecture.

In the Engineering and Architectural section of the Sanitary Congress, on September 27, the president (Professor T. Roger Smith, F.R.I.B.A., opened the proceedings by reading a paper, of which the following is a summary.

London Dwellings.

Professor Roger Smith proceeded to discuss the questions of soil, building, materials, &c., at length, and instanced a number of special cases coming within his own professional experience, as showing that much of the older parts of London consisted of houses that were unhealthy owing to defective sites, bad drainage, bad plumbing, defective water storage, the absence of proper air space, the dampness and foulness of basements, the unsoundness of attics and upper storeys, that were neither damp-proof nor heat and cold proof, and the narrowness of the thoroughfares in which they stood; and this notwithstanding the exceptional occurrence in some localities of fine old houses admirably built, and with good space in front and rear. The outskirts and suburbs, as a whole, presented, at first sight, a more encouraging aspect, and dwelling-houses were no doubt much better situated as regarded open air round them, and to some extent enjoyed a purer atmosphere; but the extent in which systematic neglect of proper precautions and paring down of everything to the minutest shred was carried was almost incredible. All those appliances connected with drainage and water supply which we

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in our wisdom considered it best to hide from sight were almost always ill-done, and generally ill-understood, so that a direct danger to health lurked behind skirting and pipe casings, and below the floors of many a showy suburban villa, or neat semi-detached residence, although it might be cleverly enough planned and prettily papered, and neatly painted, and generally attractive looking. A very large number of dwellings for the working classes had been erected in the suburbs of London, and though these were not free from defects of many sorts, and were always very cheaply put together, yet, owing to the comparatively wide space of land in the shape of forecourt and back garden belonging to them, they were far more healthy and better than the houses which operatives occupied in the heart of London. They were almost always constructed two storeys high, and were built to be occupied by two families. Thus a six-roomed cottage would divide into two three-roomed tenements, identical, or nearly so, in plan, and having separate access to the back yard or garden. Many of these were outside the metropolitan area, and had been very ill looked after; but where they had been within the boundary, or in those suburban localities where the supervision had been strict, they really formed fairly healthy and comfortable workmen's houses. In afterwards drawing attention to some of the remedies which might be, were being, or might possibly be, applied to a state of things so undesirable, Professor Smith said it would be understood that he did not much advocate legislation, unless, indeed, for such special objects as were definite and as could not be compassed otherwise. There was a great deal possible with existing Acts, especially if every district round London were to carry out its duties, and avail itself of its powers under the Public Health Act to the full. If the model by-laws of the Local Government Board were uniformly adopted and efficiently carried out, a great deal of good would be done. The public, however, had the remedy very much in their own hands if they only could be awakened. In short, the true cure for many of these evils was to be sought in the operation of an enlightened public opinion. When once the public learned to call in the aid of the sanitary inspector or the inspector of nuisances when anything was seriously wrong, we should be on the way to improvement; but if we could once create a demand for healthy houses, and induce people to look out for sanitary provisions as they now looked out for pretty wall-papers when taking a house, the battle would be won. He looked for great benefit from the action of those societies which had devoted themselves to supplying sound advice on the sanitary state of dwelling-houses. The Sanitary Assurance Association and kindred societies, by their very existence, acted as a warning to the householder that danger was to be apprehended, and by their organisation afforded him reliable advice and assistance on matters with which he was not himself able to deal. But of a large number of London houses inspected by the officers of the Sanitary Assurance Association, the percentage of these found in a good sanitary state had been ludicrously small, though it had been found possible to suggest works that had remedied all such evils as were remediable. Good was being done by the erection of houses in flats, though their advances had been less rapid than had been hoped by those who, like himself, advocated the movement in its early days. He had no hesitation in saying that the occupants of well-built flats were, on the whole, in much better sanitary circumstances than the majority of their neighbours in adjoining streets who occupied rows of ordinary dwelling-houses. Something might be hoped also from the extension of the creation of joint-stock companies or large owners of property undertaking building speculations. There were many building societies in London, but most of them were only buyers of houses, and a badly built house, if it was sure to command a rent, would not be declined because it was insanitary. At present the operations of joint-stock companies had been mainly restricted to labourers' dwellings, in erecting which they had built in a far sounder manner than private speculators, and yet had mostly managed to realise a fair profit. The building of ordinary houses in the suburbs, and of houses in flats at the main centres of London, was a great field open for such enterprise well directed; and there could be no doubt that a good public company building as an investment, would erect houses which, from their sound construction, would be a boon to the householder, with a very fair prospect of profitable return. Some very large private firms or individuals had of late become engaged in the business of supplying London with houses. Some of these were doing their work well, and were becoming alive to the fact that a sound, healthy house was an article which would sooner or later, as sanitary knowledge extended, be at a premium, if its excellence were not appreciated yet; and as some of these people fortunately built, in part at least, for investment, some of the worst of the evils of the leasehold tenure system were likely to be by degrees overcome. If it were possible to bring in the custom for leases for long terms, and to make landowners sensible of the responsibility which really rested upon them in respect of the houses they allowed to be built on their land, and if, in addition, we could induce capitalists to build as an investment, so that they would have a direct interest in the solidity of what was put up, then surely we might hope that what remained to be built, or rebuilt in London would be better fitted for living in than the houses hitherto erected. But there remained one part of the community whose case was so bad that no amount of public opinion, thought, and care had proved able hitherto to effect a radical improvement, and so desperate that London cannot afford to wait. He alluded to the operatives' homes in those old parts of London where the streets were narrowest and the houses worst. This question had forced itself upon the attention of the legislature, and would probably be soon again before Parliament. The chairman went on to give an account of what had been done to improve the dwellings of London working people during a period which might be approximately stated at nearly, if not quite, fifty years. In the summer of 1881, he continued, the amount of accommodation provided by public or semi-public agencies in London reached 11,000 families, or, estimating an average of five persons in a family, 55,000 persons, at an outlay of about 1,900,000*l.*; and there were buildings in hand, or recently erected by private builders, and by the Peabody trustees, which might be estimated as involving an outlay of not less than 900,000*l.* more, and calculated to increase the accommodation by probably 27,000 persons. He was not prepared to say that the whole of this large estimated increase—that was to say, up to 82,000 persons—had as yet been realised, but the greater part of it had, and probably not fewer than between 70,000 and 80,000 persons now inhabited the improved dwellings provided by these agencies, nearly the whole of them being comparatively lofty dwellings, arranged as flats, and with common staircases. In conclusion, Professor Smith said that London afforded now, and must for years to come afford an ample field for the energies of those who devoted themselves to the pursuit of sanitary science, the diffusion of sanitary knowledge, and the performance of sanitary work.

Discussion.

Dr. B. W. Richardson said a more faithful view of the sanitary condition of London had never been presented to any body or put upon paper. He (Dr. Richardson) knew London very well, and could bear out all that had been uttered by Professor Smith. Amongst the better-class houses things were often worse than in those of the lower class. He had within the last three years visited a house where fourteen servants slept in a basement, the truckle beds being fastened to the wall so as to admit of their being folded up during the day. There was no privacy or ventilation, or any idea of cleanliness in that apartment. He had lately been called upon to attend a case of fever in a very large house, where the very couches in the fine

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drawing-room were odorous, not with the perfume of flowers or anything sweet, but of the sewer. The same remark applied to a number of houses in the same locality. The soil-pipe was full of matter, quite up to the water-closet. He had something to do with a house the drain of which had to be opened, and fifty barrow loads of sewage were taken out of it. That was a representation of what might be called first-class square houses, and how far it extended through London it was quite impossible to say. What had been said about tradesmen's houses was quite true. The wonder was that London was so healthy. London, with a death-rate of 22 per 1,000, showed the persistency of life under peculiar conditions. The city seemed to be very fortunate in regard to position and the currents of air that flowed through it. It seemed almost impossible at the present time to get over the land difficulty. No man would take a great concern in the building of houses until the time came when he could build on more than a forty or sixty years' lease.

Professor DE CHAUMONT said that though the paper read by Professor Roger Smith had special reference to London, its principles were applicable to every city in the kingdom.

Professor ROGER SMITH said, with regard to what Dr. Richardson had remarked upon the very low death-rate of London, that besides its certainly favourable conditions of climate and many other things, they must not forget that the wonderful increase of London was necessarily the cause of a low death-rate, because almost all the people who come to it from the provinces were in the prime of life, and had passed all the dangers of infancy and childhood. The increase was one of perfectly healthy people, and therefore he was afraid that London was not quite so salubrious a city as the study of statistics alone would make them believe.

THE ADVANTAGES OF LOW CEILINGS IN SMALL HOUSES.

Mr. JOHN HONEYMAN, Glasgow, read a paper dealing with 'The Advantages of Low Ceilings in Small Houses.' (See p. 174.)

THE SANITARY ASPECTS OF HOUSE CONSTRUCTION.

Dr. WILLIAM WALLACE, Glasgow, read a paper on 'Some Sanitary Aspects of House Construction.' (See p. 164.)

THE TESTING OF DRAIN PIPES AND THE SANITARY CONDITION OF HOUSE WALLS AND SUB-SOIL.

Mr. JAMES STEWART, Sanitary Engineer, Glasgow, submitted a paper on this subject. (See p. 184.)

DISCUSSION.

Dr. SIMPSON, Aberdeen, said that Mr. Honeyman's paper struck at the very root of the principles of sanitary science, as he would have them to build streets in which the houses were to be only 20 feet wide and seven storeys in height. The narrow houses advocated by Mr. Honeyman would lead to overcrowding, and this, coupled with want of light, would lead to many difficulties.

Professor JAMES THOMSON said the papers of Mr. Honeyman and Dr. Wallace each contained much interesting matter. Mr. Honeyman's object was to give more floor accommodation by reducing the height of the ceilings, and thus getting a large number of people to live in a limited space in large towns. When it became necessary to pack people closely together, it became desirable to make the most of a small space. Mr. Honeyman's recommendations were in a great degree of some account as to making the most of small spaces. It was certainly unwise to aim at having a high ceiling with a large portion of cubic space kept only for the accumulation of vitiated hot air, allowing the air for ventilation to flow along the floor about the people's feet and legs before finding its way into the fireplace. The warm air generated by the fire or gas, and more or less vitiated, was breathed by the people, and any person could test that for himself by getting up on a table or a ladder near to the ceiling.

Mr. E. C. ROBINS criticised adversely the manner in which Mr. Honeyman proposed to provide for ventilation, and suggested that in such houses fresh air might be introduced at the back of the fireplace and heated before it was allowed to pass through the rooms.

Mr. ROGERS FIELD remarked that it was of the utmost importance that drains in all new houses should be thoroughly tested.

Mr. HONEYMAN said he could only partially reply to the remarks made on his paper. There seemed to be a good deal of misapprehension regarding what he aimed at. His object in bringing up the subject was that it might be the means of preventing overcrowding, which to a great extent was due to the raising of rents. Nothing more certainly led to the kind of overcrowding which resulted in a high death-rate than high rents. If the people could be healthfully housed in high tenements it gave larger spaces round about the houses. Instead of a dingy range of houses, with a meuse lane running up between them, he would build say three blocks on the space, and leave large spaces between them. As to the tenement that had been referred to, it was in Gray's Inn Road, London. He had never seen anything better in the way of dwellings, as the houses were perfectly cleanly, bright, and airy in every respect. As to ventilation, he did not advocate the use of a ventilator at all. He would take a little bit off the top of the door, which the people would know nothing about. If a ventilator was put in the people would be sure to close it up. He had made experiments, and found that there was always more heated air in the room with the higher ceiling.

The PRESIDENT, in thanking the authors of the papers, said he had to do with the administering of an Act of Parliament while acting as a district surveyor in London, and it struck him that the less restrictive any legislation could be made the more likely were the Acts to be of service. They were beset with very great difficulties in dealing with the problem of how to house to the best advantage the poor in large cities. One would like to see them in the best possible dwellings, but these cost a great deal of money. They were compelled to provide a dwelling within reach of the wages the people could earn, and Mr. Honeyman was evidently aiming at attaining to that.

WATER-CLOSETS.

Mr. DANIEL EMPTAGE, of Margate, read a paper on 'The Merits and Demerits of various kinds of Water-closets in general use.' (See p. 187.)

DISCUSSION.

Mr. ROGERS FIELD said the drains of a house should always be disconnected from the sewer, to make sure that no gas got into the dwelling. If this was neglected there would always be smells in the house.

Mr. H. H. COLLINS, London, said he always put a trap in the drain independent of the disconnection between it and the house, and said the plan was one which he could recommend.

'THE HOUSE THAT JACK BUILT.'

Mr. H. H. COLLINS read a paper entitled 'The House that Jack built,' in which he humorously described the unscientific construction and the insanitary condition of an imaginary residential villa built from the owner's own design.

MIDDLE-CLASS DWELLINGS.

Mr. HENRY C. BURDETT, F.S.S., read a paper on 'Middle-class Dwellings.' (See p. 168.)

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Discussion.

Mr. H. H. Collins was of opinion that middle-class people were somewhat better protected than Mr. Burdett seemed to think. He admitted that there was a certain class of builders infesting the suburbs of the metropolis who had been called jerry builders, and who built such houses as Mr. Burdett had described. While that was so, some local boards did their duty; and he instanced a case in which an order had been issued for a builder of that class to take down a row of houses, which had involved an outlay of from 8,000*l.* to 10,000*l.* He therefore thought that they must not make so sweeping an assertion as that all local boards neglected their duty. The occupier of a house which was in an insanitary condition had a remedy at law if he chose to take the trouble to avail himself of it.

Professor Robinson said it was true that the occupier of a house which was in an insanitary condition had a legal remedy, but surely the great point was to prevent such a necessity. What the author of the paper had said regarding dwellings in London was borne out by his own knowledge of that city. It was within his knowledge also that there were numbers of excellent local surveyors to vestries and other authorities, who were as keenly alive to their duties as any person could possibly be, but to these the observations of the author of the paper did not apply. When they were dealing, as they had been that morning, with the means of removing sources of evil and death, it would be a monstrous thing were they to see without notice houses springing up which failed to comply with the most simple requirements of sanitary knowledge.

Dr. Alfred Carpenter said there was no doubt whatever—he knew it from personal experience, acquired from observation of those who had suffered from the consequences—that the matters that were detailed in the paper were true to the letter. He believed that the evils dealt with in the paper would be best removed were every man called upon to do his duty as a citizen in connection with his parochial position. He knew that in elections in the South, when individuals were proposed for election to local boards and town councils, the majority of the respectable people living in these respectable houses did not go down to the poll to vote for the proper persons. There was no doubt that the intellect and intelligence of the country failed to do their duty in connection with the election of sanitary boards. It therefore appeared to him that the great principle involved was that they should call upon men to do their duty as citizens in this matter. To draw the attention of the public to the conditions that were necessary to be obeyed, in connection with sanitary laws, appeared to him to be of far more importance than to rush off to Government saying—'You must do this and that.'

Mr. Rogers Field said that the statements made by Mr. Burdett were not exaggerated in the slightest degree. There had been such an abominable system of building carried on in some of the suburbs of London that houses had been let to tenants who could not stay in them. Some of the drains of these houses were laid so badly that the fall was from the sewer towards the house, and in one case, in order to get a drain cleansed, it had been found necessary to dig a hole in the garden and draw the sewage from the sewer back towards the house. There ought to be fewer builders on local boards. The origin of the evil was that the builders exerted themselves to get on to the boards, and when they got there they evaded all by-laws, or did not seek to enforce them. Although these boards had power to make regulations they never did so, and thus the builders were not looked after as regarded drainage.

The President said there was much in the paper that agreed with what he had ventured to state in his paper that morning. In fairness to the great many hard-working men who were striving to do their duty in the face of great difficulties, he wished to be allowed to remind the Congress that London was a large place, and if some of the surveyors were not sufficiently supported, the majority of them were working hard, and doing their best, and, but for their labours, things, he believed, would be a great deal worse than they were at present. These surveyors had a very onerous task to perform. It was hardly correct that the Board of Works in London had no medical or sanitary advisers. They were advised by two gentlemen of skill in regard to drainage.

Mr. Burdett said he could endorse all that the President had said about the earnest way in which the local surveyors did their work. Nobody appreciated their labours more than he did. The paper was not directed against the local surveyors, but was to call the attention of the ratepayers to the fact that they ought to support the surveyors. He would not like it to go forth that they thought a legal remedy preferable to a healthy house. If they wanted healthy houses the duty of the citizens was to combine to get up some organisation with a view to securing proper representatives upon the local boards.

The Scavenging of Towns.

Mr. John Young, Inspector of Cleansing, Glasgow, read a paper on 'The Scavenging of Towns.' (See p. 190.)

Discussion.

Professor Gairdner said that the whole character of the paper showed that Mr. Young had his heart in his work. As Mr. Young had said, the work was not of a kind that was popular, and all that was done was open to remark from persons who were determined to find fault. In order to know what had been done in Glasgow in this matter it was necessary to look back, not, perhaps, at the time when Dr. Arnott visited Glasgow and found court behind court filled with families, while in the centre there was a piled-up midden that was sold for the benefit of the dwellers in the court; so that, as Dr. Arnott described it, the people were literally living upon the produce of their own filth, and jealously guarding it against being removed by the authorities. That was the original state of Glasgow, and that was what they had been gradually getting away from. After alluding to the unsatisfactory system of cleansing by contract which prevailed at the time when he was medical officer of health, Professor Gairdner said he was very glad that Mr. Young regarded himself as an officer of the Health Department, because he could not conceive of the cleansing of a town being well managed where the scavenging was not part of the work of that department.

Dr. Alfred Carpenter said he had had an opportunity of going over the works described by Mr. Young, and he must confess that to him it appeared to be an advance upon a great deal of similar work that was performed in other towns. An important feature, and one which was highly favourable, in connection with the works was that they were not destructive. It was to him a very great and a very serious evil to see materials of value destroyed simply for the purpose of getting rid of them, but at the works at St. Rollox an effort was made to utilise everything that was likely to be useful. The manner in which that was carried out appeared to him to be as little objectionable as anything of the kind possibly could be that had to be carried out in the midst of a great population. There was one benefit which the 2,400 farmers who were customers of Mr. Young derived from the manure being sent off in waggons as quickly as possible, and that was that they would get it on to the land before putrefaction had deprived it of its value. He could not let that opportunity pass without expressing his full approval of the condition of things he had seen at St. Rollox. He felt that that was a specimen of work that might very well be copied by the London authorities, because there was nothing at all equal to it in the Metropolis. A proposal had been considered by the Sanitary Authorities of the City of London for destroying entirely the whole of the refuse that they collected from the streets, ashpits, stables, and cow-houses, because it would cost something like 12*s.* a ton to take it to the outside of the city, while it would be worth

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only half-a-crown when it was got to the land. He was opposed to such a proposal, because he thought it would result in injury to the country.

Mr. ALEX. FREW, Glasgow, said that the work of the Glasgow Sanitary Department, he had reason to believe, was carried on in the most satisfactory way, but he would just tell them how sanitary matters were managed in one of the most fashionable burghs outside of Glasgow. Behind a terrace of self-contained houses there were ten or twelve ashpits within a few feet of the back wall. These pits were built of brick, and the refuse thrown into them was generally allowed to lie for six months before being removed, or at the best the places were not cleaned out oftener than three times a year. Surface water got into the pits, the rubbish decomposed, and a most abominable smell was created. When this refuse was carted away it was not taken to the country or burned, or anything of that kind. It was taken out by the back door and put in front of another terrace. It was put into a hole and then covered over with six or eight inches of soil, and in the course of a few years a board was put up bearing the words—'This eligible site to feu.'

Mr. YOUNG, in reply to Mr. Honeyman, said the work executed by the horse machine was far more perfect than that done by hand. On a well-paved street the brush cleaned out the spaces between the stones, and the work was better done than the men could be got to do it. A series of uniform boxes had been made and were now lying in store ready for use, and it was expected that the public would come to see the benefit of adopting them.

THE VENTILATION OF SEWERS.

Mr. J. WALLACE PEGGS, C.E., read a paper entitled 'The Ventilation of Sewers and House Drains.'

Mr. W. P. BUCHAN, Glasgow, read a paper on 'Ventilation of Street Sewers,' in the course of which he described three methods by which ventilation of drains could be accomplished.

EVENING MEETING.

In the evening Dr. W. B. RICHARDSON delivered a lecture to the members of the Congress, taking for his subject—

FELICITY AS A SANITARY RESEARCH.

From which we extract the following passages :—

There was a noted physician I once knew well, who told me at the close of a career of fifty years of active practice, during which few men had seen more of his fellow-men, or had observed more keenly, that he never had met a perfectly, or, indeed, a comparatively happy human being.

PHYSICAL CONDITIONS INFLUENCING FELICITY.

To arrive at the true mode of working for this object we cannot do better than survey, in the first place, the conditions under which the phenomena of felicity, and of its opposite depression, or infelicity, are manifested. By a sort of general impression the weather is believed to exert a peculiar influence for and against the phenomena of felicity. In this view there is undoubted truth. An increase of the atmospheric pressure and a decrease is each a cause of felicity. In ascending from valleys to moderate heights there is, up to a certain distance, a distinct effect of the kind. So definite is this action that I know of one person who, under some conditions, feels life is a load too hard to bear, but who, in a dry, bright mountain region to which resort is often had, throws off the despair altogether, and lives a new life. In the nicely-adjusted balance of atmospheric pressure against animal circulation of blood, the circulation is relieved by a moderate removal of pressure. But if such removal be too great, if the organs of the body become congested from the removal, as they may be, the spell is broken. The brightness of mind induced by removal of pressure and freer circulation is, however, bound by other conditions. Dryness must accompany lightness of air to produce the state favourable to felicity. There may, again, be conditions in which a slight excess of pressure may be conducive to felicity. In regions where the land is low, compared with the sea level, a slight atmospheric pressure may be advantageous. The comparison of children living under differing circumstances is sufficient proof of this fact. Children in an open, well-ventilated schoolroom, how different are they from those who are immured in the close, over-packed dens which are miscalled schoolrooms. The felicity of the children of the well-to-do who live out of doors, and even of the children of the fields and open streets, compared with the felicity of the small trader whose back parlour is living room and playground ; the felicity of the man or woman who leads an outdoor life, compared with the felicity of those who live in the close office or workroom, how entirely different.

TEA, WINE, AND TOBACCO.

As a rule all agents which stimulate—that is to say, relax the arterial tension and so allow the blood a freer course through the organs—promote, for a time, felicity, but in the reaction leave depression. The alkaloid in tea, theine, has this effect. It causes a short and slight felicity. It causes, in a large number of persons, a long and severe and even painful sadness. There are many who never know a day of felicity owing to this one destroying cause. In our poorer districts, amongst the poor women of our industrial populations, our spinning, our stocking weaving women, the misery incident to their lot is often doubled by this one agent. There is another agent more determinate in its effects and contrasts than tea, and that is wine. I am a total abstainer, but I am, I trust, an honest observer also, and I confirm, from direct observation, the old saying that 'wine maketh glad the heart of man.' If it did this and no more, I should say let the felicity of wine remain to the world. Wine, like the alkaloid in tea, relaxes, lets loose the channels of the blood ; gladdens like the ascent of the mountain side ; gladdens like the gentle atmospheric pressure which forces more blood on to the internal parts. But, and here alas ! is the rub. Carried a little beyond the right mark, the felicity from wine passes into folly, the folly into feebleness, the feebleness into stupor, and the stupor into a depression, the reaction from which is the bitterest, the most persistent. Tobacco is another of the substances used to produce abeyance of anxiety. It is said to sooth irritability without stimulation, but it leaves in many persons long depression, coupled generally with an appetite for a renewed indulgence in it, which becomes intense. The confirmed smoker, who can stand out against indirect effects, whose taste for food and whose digestive endurance are little injured, is kept during the whole time he indulges in the state of suspension. He does not enjoy felicity, but for the time experiences a relief from infelicity.

HABITUAL, SENSATIONAL, AND MORAL INFLUENCES.

Physical work, when it is carried short of exhaustion, keeps up felicity, and sloth destroys it. But the physical work that exhausts kills felicity. The argument extends to mental work. Moderate, wholesome, mental work is the best of all aids to felicity next to sleep ; it strengthens the mind, it softens grief, it lessens care. Carried to excess, it is pernicious, and destroys all felicity.

PRACTICAL DESIGN FOR FUTURE SANITARY WORK.

In the direction of education the sanitarian teacher should, I think, begin to study the psychological side of humanity ; what human nature can and cannot bear ; how much pressure can safely be put on humanity without danger of explosion : how much felicity can be secured by removing that danger. Beyond the task of inculcating

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what are the necessities calling for pure atmospheres within and without the body, we can, most appropriately, explain what agents taken into the body are for felicity. We can teach what temperance in all things effects in this direction. We can denounce every indulgence that undermines and mocks and destroys the blessing. We can insist on cleanliness; cleanliness of body, cleanliness of mind. We can show how flowers and plants grow for health as well as beauty, and why, for both health and beauty, they must join the home circle if felicity is to enter it. These are all sanitary questions, and they all, as one, bear on felicity.

Professor HUMPHRY, in moving a vote of thanks to Dr. Richardson for his lecture, said it had, in the first place, tended to show that happiness was very closely allied to the stomach. Health was the great medium of happiness, for where there was health there was happiness. They of the medical profession often met with persons living in beautiful houses, and surrounded with all the luxuries of life, who were not happy, because they were not well. No doubt happiness was the prevailing element of human life. No one could walk through the streets of Glasgow where the men were bustling about, and where little children were to be seen playing around them, without feeling that these people were really all happy. People could adapt themselves to almost any conditions and any circumstances of life. The little alley and the dark cheerless room became a real source of happiness to the individual who for some time dwelt in it. Dr. Richardson, in his lecture, had rubbed many of them the wrong way. He told them of the evils of alcohol, of tobacco, of tea, and of love. He was bound to say that he thought without tea, without tobacco, without alcohol, and without love, they would on the whole have rather a dull life in this world. He wondered how Dr. Richardson had lived without them all, for he expected that such a jolly-looking man must have had his share of them.

STATEMENT BY THE JUDGES.

Dr. ALFRED CARPENTER read the following statement by the Council of the Institute in reference to the awards of the judges in the exhibition of sanitary appliances. The question of poisoning by the use of lead paints was one of such great importance to all classes of the community that the Council had considered it advisable to submit to the Congress a report of a committee specially appointed to consider the matter.

The report, which was signed by Professor Corfield, Dr. H. C. Bartlett, and Mr. Ernest Turner, F.R,I.B.A., was as follows:—'We, the sub-committee of the judges appointed to make an investigation into the composition and properties of non-poisonous white paints, and their driers, more especially as to the presence or absence of lead, beg to report as follows:—We have examined three different non-poisonous white paints, and the driers supplied with them, and we have found that, although all the paints are practically free from lead, two out of the three driers supplied with them contain lead in large quantities. The committee would call special attention to this fact, for, although, according to the directions of the makers, the driers should be used in the proportion of only about 7 or 8 per cent., they are in practice mixed with the paints to a very much greater extent, and consequently the paint, when prepared for use with driers containing lead, becomes a poisonous paint. It is, therefore, essential, when using a so-called non-poisonous paint, to carefully ascertain that the driers used, as well as the paint itself, are free from lead. There appears, moreover, no substantial reason for the use of lead driers, for in the only instance in which the paint and driers were both free from lead, the result obtained in the trials made to ascertain the comparative merits of the different paints for decorative purposes, was superior to either of the others. We have not been able to continue the experiments for a sufficient time to report upon the durability of the various paints.'

SECTION OF CHEMISTRY, METEOROLOGY, AND GEOLOGY.

Dr. R. ANGUS SMITH, the president of the section, read an address on 'Air as a Sanitary Agent.' (See p. 154.)

DISCUSSION.

Sir JAMES WATSON said, with reference to Dr. Smith's observations on smoke, he only hoped that he would take the subject in hand, for even in the centre of the town the amount of smoke was a crying nuisance.

Dr. CAMERON, M.P., expressed a hope that if Dr. Smith took the smoke nuisance in hand, he would go also into the country districts and apply his sensitive nose to the fœtid smoke arising from the bings of burning shale and refuse to be found around Glasgow. Dr. Smith's address was particularly valuable at the present time, when chemistry and sanitation are undergoing a very considerable change. The purely chemical school of Liebig, which pointed out the importance of pure air and pure water as well as it could be pointed out, was giving way to a large extent to the zymotic or vital school of Pasteur. Now so long ago as 1848 Dr. Smith suspected that not to impure gases alone should we attribute outbreaks of disease and although in this country the vital philosophy, as regards disease, had not made so great way as it had on the other side of the channel, yet important contributions had been made by two men in this country. One of these contributions was by Tyndall, who had done good service in the vital analysis of air, while Dr. Smith had invented a process for the vital analysis of water, which, the speaker thought, might be looked upon as a fresh starting-point for sanitarians in their search for pure water. He believed that Dr. Smith was pursuing these investigations, which had been to a certain extent turned to practical purpose in the analysis of the water of the Thames, and great results might be looked for from this discovery.

The CHAIRMAN, Dr. ALFRED CARPENTER, in conveying the vote of thanks to Dr. Smith, referred specially to what he had said as to the utilisation of sewage. He himself had for many years been interested in that subject. He had seen, and did see, the sewage of a population of 80,000 utilised with the best results. Land had been purchased by the local board, under whom it was worked at a cost of 180,000*l*. The interest upon that money was being paid. The land itself, which formerly would only bear one ox or half an ox per acre, was now bearing food for three and a half oxen per acre; and food was being provided for the people, and abundance of milk was being sent from the farm for the use of the people. Again, before the farm came into operation there was only one person occupied for every fifty acres, whereas now occupation was provided for one person on every four or five acres. There was therefore abundance of employment, and a very large production of animal food for the people; and there was a large amount of money paid to the original owners, who had been made rich men; while the sewage of the district had been entirely utilised at very moderate expense to the district. He contended that a town had no right to discharge and to destroy that large amount of ammouia spoken of by the lecturer; and if so, they were doing their country a very serious injury, for which they ought undoubtedly to be called to account. Until they took care to keep at home for their own purposes at least a large amount of the ammonia that had been referred to, they would not be doing their duty as citizens. On the part of the audience, and on his own, he had to convey to Dr. Angus Smith a hearty vote of thanks for the paper he had read.

Dr. ANGUS SMITH, in acknowledging the compliment, said he was afraid that Dr. Cameron in his extreme courtesy had given him credit for some things which must be referred to others. He certainly was working upon the analysis of water, and thought he had found some things which he believed were new; but he was afraid lest Dr. Koch should imagine he (Dr. Smith) claimed the gelatine

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process, and therefore he was anxious to say that Dr. Koch had the entire credit of having begun the use of gelatine.

Smoke Abatement.

Mr. W. R. E. Coles, London, read a paper on 'Smoke Abatement.' (See p. 181.)

Discussion.

Mr. G. W. Muir contended that, in the desire to abate the smoke nuisance from furnaces, the people had relied upon inventions when dimensions were all that required to be attended to.

Dr. Alfred Carpenter agreed with the statement that there was no reason why the chimneys of manufactories should send out smoke. It was a matter which the people themselves could settle. He was glad to see from the newspapers that the authorities of Glasgow had commenced to take proceedings against the offenders. In London no manufacturer would dare to send out smoke, because he would be pounced upon at once by the police and prosecuted. Indeed, he never saw a chimney in London sending out smoke in the way he had seen them doing in Glasgow. With regard to domestic chimneys, there was a difference of opinion. It was quite certain that they could not indict the whole people, and therefore he would impress on the Congress a point that he pressed on the Society of Arts three years ago, but which did not meet with much favour. Still he considered it was the right one. The large proportion of smoke in large towns—and this interested not Glasgow alone, but also London, which from its large extent was becoming a forest of houses, or, as one gentleman had called it, a desert of houses—tended to produce fogs, and he believed these were sometimes more dense in London than they were even in Glasgow. How was that to be done away with? His impression was that if the Legislature gave the local authority power to license chimneys to discharge smoke into the atmosphere, and let the produce of the licenses belong to the local authority for the purpose of reducing the cost of sanitary operation in the particular district, they would soon find the smoke nuisance would be very materially abated. They would also find that the appliances which science had brought out, such as stoves and warming apparatus, would soon get rid of a very large amount, say four-fifths, of the smoke that arose from the domestic chimneys. They would also provide a source of profit to the Local Authority from those who liked to have their open fire, and have the privilege of poking it. That to some extent was one of the sources of smoke, and it would be more beneficial and less costly to the owners of poor property to have smoke-consuming fireplaces, or that cooking should be carried on by gas. They would then have a very large amount of that smoke removed from the atmosphere without any of those various changes which had been suggested—that of laying on very heavy penalties against the offenders and preventing people having a fire to look at if they liked. He thought the plan he had suggested would be found in the end to abolish the smoke nuisance more effectually than any others they could think of.

Mr. Coles said the first question was to avoid the production of smoke, and he contended that whilst it was possible in a sense to consume the first products it was not practicable in a broad sense to consume smoke. It should be prevented.

The President, in conveying a vote of thanks to Dr. Coles for his paper, said that it was of considerable importance that such institutions should exist in the country, because by making experiments it kept the matter continually before them. They had too many institutions merely for inquiry—but that was not enough. Even Royal Commissions confined themselves to acquiring information which existed among the people, and then gave it out in reports. What they desired most in nearly all the branches of sanitary inquiry was a proper series of experiments, and these, he believed, were all carried out for small fireplaces by the Smoke Abatement Committee. Larger experiments, which were very expensive, could perhaps only be made by those who had large works, and were able to spend a considerable amount of money upon them. He alluded to the new methods of using coal, for example Siemens' carbon furnaces and Jamieson's furnaces. He also wished to call attention to the latest development of the Jamieson furnace, which he found in action near Glasgow, although, so far as he knew, it was not in use anywhere else in the kingdom. He happened to go out the Great Western Road, and there he saw a considerable number of large heaps of waste coal, and he was told that in one of these a method was being employed to burn the smoke from them. He found that tubes had been inserted to a considerable depth into the mass, and these were drawing out the air and gases from the centre, and from under the surface of these heaps—the air going in by the surface, the smoke and some air of course being drawn out by the tubes. This smoke was carried off in long tubes, and from these there was a constant flow of liquid, which contained ammonia and oil. The smoke had ceased from that part of the heap where these tubes were inserted, so that this process of Jamieson's had made it possible to burn these enormous heaps, whose destruction was very important, without being in any way offensive to the neighbours, and that, he believed, if not at a loss, at least without very great expense. Then there were different kinds of smoke—black and grey smoke—and as the colour was different the composition was different. In house fires the combustion was not sufficiently strong, the oleaginous matters were not sufficiently heated, and the smoke of a black colour was produced. Any method which increased the heat of combustion would enable them to get rid of this black smoke. Mr. Muir's statement was that smoke could be consumed by proper apparatus, but Dr. Smith was looking forward to an improved use of coal, which would not depend on those mechanical agencies which Mr. Muir alluded to. He found that in most towns those who were entrusted with the duty of putting down smoke were smoke producers themselves, and it was, therefore, difficult to get these Acts put into operation. He looked more, however, to invention and to the spread of knowledge amongst the people than to legislation for improvement in this matter.

Comparative Merits of Coarse and Fine Flour.

Dr. Wm. Wallace, Glasgow, read a paper on the 'Comparative Merits of Fine and Coarse Flour as Articles of Food.' He never ate white bread if he could get what many called household bread, or still better, whole-wheat bread; and he thought a little education would incline the general taste in the same direction. But it was the fact that the people of Glasgow, and particularly the working classes, ate nothing but the finest bread, rejecting the good, honest, and eminently wholesome bread made from home-made flour, as if it were unfit for food. It was greatly to be regretted that the use of oatmeal was gradually but surely being given up by the working classes in Scotland, especially in large towns; and there could not be a doubt that the liberal use of porridge and milk, as contrasted with white bread and tea, would improve the general health of the people.

Mr. Colman called special attention to the dangers arising from the use of so-called corn flours. They were flour deprived of some of its most essential constituents as food. He had known cases in which they had been used for the food of children with a small quantity of milk. The inevitable result was that the food was insufficient, and the consequences must be serious.

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Disinfection by Heat.

Dr. Adams read a paper on 'Disinfection by Heat; with a Description of a New Disinfecting Chamber.' D. W. Henry, of Manchester, he said, was the first to conceive the notion, and to demonstrate by actual experiment the fact that the material of certain contagious diseases was rendered inert by exposure for some hours to a high temperature. The germ theory originated in a hypothesis of Kiveler about 200 years ago, but was first distinctly enunciated by Pasteur within the last twenty years. It had been subsequently corroborated or illustrated beyond all challenge by Tyndall and other observers, and the doctrine was now generally held that it was probably through living 'organisms,' or germs, that all epidemic and contagious diseases were propagated. 'Germs' or 'particles' of contagious matter were very volatile, a consideration of the foremost importance in devising or selecting agents for their destruction. The action of heat in destroying 'germs;' the degrees of temperature, and duration of exposure that was necessary for the destruction of 'germs,' varied according to the species of 'germs,' and to the stage of development at the time of exposure; but in all cases an exposure of several hours was necessary in practical operations, for while extremely high temperature would effect more immediate destruction, there was a limit within which heat could be applied so that the fabric of clothing or other material with which infection was associated might not be injured or destroyed along with the germs. Dr. Adams's new disinfecting chamber was merely a workshop model, and therefore open to improvement in course of regular manufacture, but it illustrated the 'principle' of its construction. Portable and of cheap construction, it disinfected by dry or by moist heat, as might be preferred, or by a combination of both. The clothing was not exposed to products of gas combustion, which in some measure were conservative, but to oxidising currents of pure air. A maximum temperature was maintained by a simple contrivance acting automatically. Infected articles were subjected only to a safe maximum temperature, but the volatile contagious matter emanating from infected articles was not permitted to pass into the atmosphere, but was confined within the chamber, and drawn through a furnace, thereby ensuring destruction beyond all question of fallacy. The air of the chamber was kept in active circulation by an arrangement that acted automatically. The gas consumption was regulated automatically, and was in quantity about half that of any other apparatus.

Dr. Sutherland asked if Dr. Adams had succeeded in destroying the ova of vermin.

Dr. Adams said it had been clearly demonstrated that they were destroyed at a temperature of 212°, and he did not believe that any of them could live in the still higher temperature of 230°.

The Chairman said the first experiments upon this subject differed a good deal from those by later observers, especially upon the life of bacteria; and the question arose whether after exposure to heat, even if they were not dead, they did not change their character. He found by experiment that by exposing flesh-meat to a temperature of 180° it could be kept for a couple of years in such a condition that it could be eaten with pleasure, and that the difference between it and fresh meat was scarcely perceptible. This showed that these organisms were not killed by this heat; they were at least changed, so that their power of putrefaction was destroyed. They were, he thought, sometimes a little hard on these low forms of life, and he wished to suggest whether they were always connected with disease, or whether they might not occasionally be of use for giving us health and strength. This was a speculation, but he did not know that it was not worth attention.

The Pollution of Rivers.

Mr. Henry Robinson, M.Inst.C.E., read a paper on 'River Pollution.' (See p. 166.)

Treatment and Utilisation of Town Refuse.

Mr. Symons read a paper prepared by Mr. John Collins on 'The Treatment and Utilisation of Town Refuse.' (See p. 189.)

The closing general meeting of the Congress was held in the same hall at 5 p.m. Professor Humphry occupied the chair, and among the others present were—the Hon. the Lord Provost, Mr. J. Wyllie Guild, Mr. J. C. Burns, &c.

Dr. Alfred Carpenter, the president of Council, stated that circumstances had arisen which would prevent next year's meeting taking place at Cheltenham, as was intended. He had also to inform the meeting that the Council had received a very influential requisition from Dublin asking that the Congress of 1885 should be held in that city.

The proceedings terminated with a public banquet.

Dr. Russell, in giving 'The Army, Navy, and Reserve Forces,' said he did not think people generally had any idea how much sanitarians owed to these forces. The presence of Professor De Chaumont suggested to him that the literature of sanitation largely originated in the necessities of the army. It was also to the necessities of the army that they owed such men as Captain Douglas Galton and many other eminent names. The considerations of the health of the military forces brought them face to face with the question of the money value of health, and, conversely, the money loss which attended the loss of health. If these men were scattered up and down the country like the ordinary members of society there might be a good deal of ill-health, and great injury might be inflicted by the unsanitary condition of the surroundings, and it would be a long time before the public attention was attracted. But when they were told that in times past on an average 4 per cent. of the men in the army were incapacitated by sickness, they began to have some definite and clear conception of what the possession of health meant, and of what was meant by its loss. He coupled with the toast the name of Professor De Chaumont.

Professor De Chaumont, in replying, said that in the army the vocation of killing men was more profitable than the saving of life. The army medical staff had done a great deal for the health of the forces, and many eminent practitioners had performed valuable public services in devoting their talents to the subject of dealing with all diseases which tended to inflict loss upon the army.

The Lord Provost, in responding to the toast of 'Prosperity to the City of Glasgow,' said he had been much pleased to hear how the subject of smoke was treated by Dr. Angus Smith. In Glasgow they had more smoke than they ought to have, but in such a climate it was almost unavoidable. In the winter months there were about 150,000 fires going, and when the chimneys of the many factories and workshops were added to these it was clear that the atmosphere could not be otherwise than greatly polluted. Dr. Smith had recommended them only to patronise such steamboats as gave forth little smoke. While in the North of England during the last fortnight he had had the pleasure of sailing up one of the lakes, and was pleased to find that nothing but coke was used in the furnaces of the steamers. Were the same system of firing adopted on the Clyde tourists would have a much better opportunity of viewing the scenery about its shores than they had at present. He had watched the proceedings of the Congress during its stay in the city with much interest, and while he highly approved of the work undertaken at these annual gatherings, he set very great value upon another department the Institute had organised. It examined local surveyors and nuisance inspectors, giving them diplomas of efficiency if they passed the examinations they were subjected to. He hoped these examinations would be taken advantage of by all officials throughout the length and breadth of the land, who were anxious to show that they were competent to discharge the duties undertaken by them. He concluded by proposing 'The Sanitary Insti-

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See Testimonials of entire Medical Press and from leading Dermatologists.

WRIGHT'S LIQUOR CARBONIS DETERGENS.

THE PRACTITIONER of September 1881, reports a lecture entitled 'Recent Advances in the Therapeutics of Diseases of the Skin,' by W. A. JAMIESON, Esq., M.D., F.R.C.P.Ed. The following is an abstract therefrom :—'Itching, which owes its origin to too slow a current of blood, of which the most typical example is that seen in **Eczema** connected with varicose veins of the leg—but to the same category also many examples of Pruritus Scroti, Labiorum, and 'Ani may be referred—is best relieved by careful flannel bandaging, well applied suspensory bandages, and laxative salts or mineral waters, which unload the rectal veins by freeing the portal circulation, combined locally with **weak tarry lotions**, one of the best of which is **Wright's Liquor Carbonis Detergens**, a well-made **alcoholic solution of Coal Tar**, suitably diluted.'

From **THE LANCET**, Dec. 22, 1866 :—'In our hands it has been a most effective agent in skin diseases, especially of the chronic eczematous class; and one case of psoriasis, which had resisted all other kinds of treatment, speedily got well under the application of the **Liquor Carbonis Detergens**. We esteem it a very valuable addition to our list of skin remedies.'

From the **MEDICAL TIMES AND GAZETTE**, January 19th, 1867 :—'We have more than once called attention to the value of this remedy in **chronic eczema**.' its value as a detergent agent. We consider the Liquor is an article of great utility.'

From the **BRITISH MEDICAL JOURNAL**, September 22, 1871 :—'We have tested it, and can affirm

From the **BRITISH MEDICAL JOURNAL**, April 1st, 1882 : 'This is by no means a new preparation, for it has been in extensive use for many years. It is an alcoholic solution of Coal Tar, and is a disinfectant of considerable value. Medicinally, it is often used for the destruction of pediculi, and as an external application in eczema, psoriasis, and other skin diseases.'

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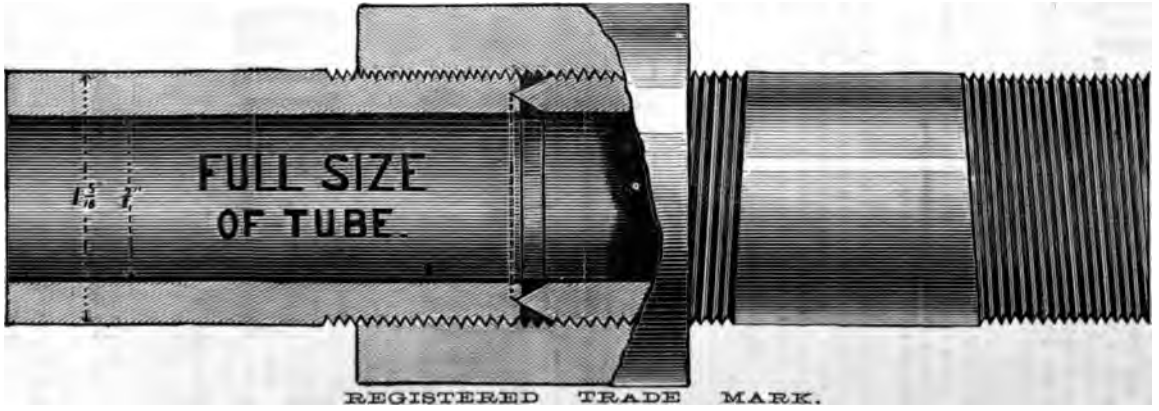

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tute of Great Britain,' coupled with the name of Dr. Carpenter.

Dr. ALFRED CARPENTER, in replying, said all that had been said by the Lord Provost was correct with regard to their aspirations as a Congress. They did hope that the time was not far distant when those who were appointed to the important offices of inspectors and surveyors would be called upon to show that they possessed some knowledge of the duties they were undertaking to perform, because it had come to the knowledge of sanitarians years ago that a very large amount of mischief was done by persons undertaking to do work about which they knew nothing. They had only now to go through the streets, of southern towns at any rate, to be very quickly impressed with the belief that there should be an extensive acquaintance with sanitary science, for in almost every street they would see the sign sanitary engineer. Every little plumber in the place, every person who had anything to do with drainage, styled himself a sanitary engineer, and was insulted if you doubted his ability to perform the duties which devolved on a sanitary engineer. He would undertake to do anything, and the result had been in a large number of cases that these men had introduced disease into houses. For that reason sanitary science stank in the nostrils of the people in more ways than one. It was because of this condition of things that the Sanitary Institute was established, and he was glad to say that year by year people were beginning more thoroughly to appreciate its operations; to look to it to hold up a beacon of warning, to provide for them a chart to enable them to sail correctly, and also to be a sort of pilot to lead them through dangers that existed on every side. The powers that be cared little for life-saving. A great deal more care was bestowed on those who were accustomed to kill. The Sanitary Institute stood in the same position with regard to honours, payment, and appreciation as did the sanitary authorities. They were patted on the back and told to be good boys, but they got none of the plums. He was wrong; they did occasionally get a plum, and one of these plums had fallen to them in their visit to Glasgow. He knew a great deal of Glasgow before. He was thoroughly acquainted with its sanitary literature, and was satisfied that there were great opportunities for the cultivation of sanitary work, of which full advantage had been taken. They hoped, in coming to Glasgow, to teach their northern friends something, but they had been taught something themselves, and would take home a great deal of pleasurable recollection of their visit, and a great deal of information as to the manner in which great difficulties had been overcome. He hoped the visit to Glasgow would be one of the epochs in the history of the Institute, for he trusted that they would soon be able to go to the Government and say that the time had now come when regulations should be framed to prevent Town Councils, Local Boards, or other sanitary authorities appointing 'duffers' to fill the offices to which he had referred, without any previous examination of the candidates, and that those who had the diploma, certificate, or licence of the Sanitary Institute should be preferred over those who had no knowledge of the subject.

DR. ALFRED CARPENTER'S LECTURE TO WORKING MEN.

The last meeting in connection with the Sanitary Congress of 1883 was held in St. Andrew's Hall on Sept. 29, when Dr. Alfred Carpenter addressed a large gathering of the working classes, his subject being—

PUBLIC HEALTH: A WORKING MAN'S QUESTION.

Dr. CARPENTER commenced his address by saying that the statement was frequently made that sanitary science had nothing to do with the working man, but he hoped to show conclusively that it was in a great measure a working man's question. The working men had a great deal more to do with the health of a given district than any other men who lived in it. The rich man, the professional man, or the merchant could take away his wife and family if there was anything wrong in the city, but the poor man must stop near his work; he must keep to his work or else he would lose his income altogether. Was Glasgow any the worse of the expenditure of a million of money or more in bringing Loch Katrine water to the city? Had it not been a tower of strength to the people of Glasgow? Had it not increased the prosperity of the place to a much larger extent than the expenditure of money that was required to bring it here? In the district in which he resided the condition of things with regard to the water supply was most unsatisfactory while he was chairman of the water company of the place; and he impressed on his colleagues that, so long as the water supply and fittings were of the kind that existed, the community was in the greatest danger and liable to the incidence of disease of a very severe character. He persuaded the committee to agree to certain alterations, and as at that time it happened his term of office expired he had to go before the electors. The owners of property went about to the electors in the district and said, 'If you vote for Dr. Carpenter, and these alterations which he suggests are carried out, we shall be obliged to raise your rents,' the result being that, instead of heading the poll, as he had previously done, he was at the bottom. The question of how many deaths had taken place in a year was one thing; but the question of how much sickness, how much suffering, how much infelicity there had been amongst the people during the same time was a much larger question. He should take the average sickness of a working man at seven days per year, and he should tell them how he got that average. It was from the returns of the great benefit societies—the Oddfellows and the Foresters. Now, in a certain district he had been inquiring into there was a manufactory which was reported to be of an unhealthy character, and in which the workmen were thought by outsiders to be following an unhealthy trade. That factory had a benefit society of its own. He found that in that factory, which was managed on the most strictly sanitary principles, the amount of sick pay that had been paid during the last two and a half years had only been at the rate of three and a half days per annum per member. There was a great saving to the working man in the difference between three and a half days' and seven days' sickness per annum. Taking seven days as the average sickness in London each year, and reducing it to six or raising it to eight—and that was probably nearer the figure in Glasgow—they would see what an enormous difference was the result. Supposing there were 50,000 members of benefit societies in Glasgow, and each member had seven days' sickness in the year, that was 350,000 days' sickness per year which members drew pay for. By a very slight reduction in the death-rate they would save to the working men 100,000 days of sickness per year, and not only that they would thereby enable them to earn their usual wages. Dr. Carpenter said this showed conclusively how much the question of health was a working man's question. In speaking of the unhealthiness of Glasgow he was not saying anything in condemnation of the Glasgow authorities, because they had done their work wonderfully well. They had had almost a superhuman work to perform, but that they had done it well was proved by the fact that they had brought down the death-rate from 36 to 35 per 1,000 per annum to what it now was. He therefore said—All honour to those men for what they had done. But the authorities ought not to rest contented even with that. They ought not to rest contented till they had brought down the death-rate to what it was in London at any rate. If he was not mistaken, this metropolis of commerce had a desire to beat London. Well, it had also the power to beat London, because Glasgow possessed advantages which London had not got.

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Dr. Carpenter went on to refer to a paper he heard read in 1874 by Baillie Morrison, who then gave certain causes as accounting for the high mortality of Glasgow. Mr. Morrison held that character and occupation had a good deal to do with the high mortality. He (Dr. Carpenter) contended that character and occupation were not reasons at all for high mortality, and he instanced the fact that there were no healthier districts than those that suffered from the cotton famine a number of years ago. It was the case, on the other hand, that with high wages and plenty of work there was always a high mortality. It was a very serious reflection that, the more prosperous Glasgow was, *pari passu* the higher would be its mortality. Character might have something to do with it, but men were not vicious from choice. Overcrowding was not a complete reason for the high death-rate of Glasgow, because there were districts in London, like Shaftesbury Park and Peabody Buildings, where there were more than 1,000 persons to the acre, and where the death-rate was only 14. Why was that? It was because nearly the whole of the occupants of those dwellings were total abstainers. Among the circumstances to which he attributed the high death-rate of Glasgow there were two over which the people themselves had no control. One was that the houses were built of stone and were not pervious to air in the same way as the jerry builders' houses in London. No air penetrated the walls of the Glasgow houses, and one of the results was foul air in the compartments. He had a proof of that in the fact that cold weather at once raised the death-rate in Glasgow. The people kept the fresh air out of their houses in trying to shut out the cold. That was one other reason, foul air, which was mentioned by Baillie Morrison, who also referred to the high infant mortality in Glasgow. Thirteen per cent. of all the babies born in Glasgow died in the first year of their life, and nearly one-half did not reach their sixth year. This sad state of things was brought about by the evils he had been speaking of. Worse even than the foul air, however, was the whisky shop. The money that should go to the support of their children went in too many cases down the throats of the fathers and mothers in the shape of whisky. The other circumstances he wished to speak of as contributing to the unhealthiness of the city, and yet over which the people had no control, was the water supply. Serious evil followed from the city's pure water, because the purer the water was the more absorbent did it become. Before it was consumed it would imbibe in foul matters that were in the atmosphere, and would thus tend to diminish the health of those who consumed it. Passing from this subject, Dr. Carpenter pressed upon his hearers the necessity of having more than one apartment in their houses if they were to be strong and well. He then spoke of the savings bank, paying a high compliment to the working men of the city that they should be saving more money *pari passu* than any other working men in the kingdom. He wished to give them some advice on this subject, however, and it was this—that they should not starve their wives or their children or put up with one room houses for the sake of thrift. Roomy houses and fresh air promoted felicity, about which they had been hearing so much. There was another thing which promoted felicity also, and that was good cooking. Speaking of the importance of pure atmosphere, he advocated the use of gas apparatus for cooking purposes. If they used gas apparatus for that purpose, their expenditure would be less than at present, and they would have the satisfaction of knowing that they were helping to diminish that impurity of the atmosphere which certainly did much to injure the citizens of Glasgow. In sailing down the Clyde that day he was utterly astonished at the immense volumes of dense black oily smoke turned out into the atmosphere by steamers and manufactories. The owners of these had no more right to pollute the atmosphere we breathed than to pollute the streams running through the estates of the landlords. He wanted the working men to take that question in hand, and determine that public opinion in Glasgow would insist upon a stop being put to these dense volumes of smoke sent out to destroy their comfort and happiness. In doing that they would do the manufacturer or steamship owner no injury. If they were compelled to consume in boilers the tons and tons of carbon and oil sent into the atmosphere in smoke the owners would be amply repaid the cost. While the present condition of things went on, the community could not have that pure atmosphere so necessary to the enjoyment of health. He counselled the electors to send representatives to the Town Council who would take this matter in hand, and insist upon the law being put in force. Referring to the importance of good sanitary arrangements from an economic point of view, Dr. Carpenter instanced the case of the army. Each soldier in Her Majesty's army cost on an average 100*l.* to whip him out of the raw recruit into a state fitting him for service. Not very long ago the death-rate among the soldiers at Gibraltar was 21½ per 1,000, and now it was only 5½. He asked his hearers to consider the important saving that meant. The death-rate in the London police was only 5 in the 1,000. The death-rate in the army was 9 per 1,000, and in the navy 6 9-10. He attributed the lower death-rate in the navy to the circumstance that those connected with that branch of the service were not exposed like the soldiers to the influence of the whisky shops and gin palaces. He maintained that if the mortality of the city could be reduced from 26 to, say, 18 in the 1,000, the working men would be able to effect such a saving by putting by the money which would be saved through the absence of sickness that they would be able at the age of sixty to retire from work with an annuity of 10*s.* a week for the rest of their lives.

THE EXHIBITION OF THE SANITARY INSTITUTE AT GLASGOW.

THIS Exhibition, which will remain open until the 20th inst., is held in the Drill Hall, Burnbank, Great Western Road, and in point of interest is quite equal to any of its predecessors. It may have been exceeded at Croydon in the number of entries, but if the character of many of the exhibits a year or two since be considered, contrasted with the almost entire absence of anything approaching to bazaarism, on the present occasion, the Glasgow Exhibition of the Sanitary Institute may claim to take rank as one of the best, if not the best, the society has ever held, as although several well-known firms are absent, on the other hand, many new exhibitors have put in an appearance. Many Scotchmen consider their sanitary arrangements to be somewhat behindhand when compared with those of other towns in the southern parts of the kingdom, but there is no reason that this should be the case if they adopt the inventions and arrangements of their own countrymen, for it is no undeserved compliment to say that there are sanitary appliances here of Scotch invention that are second to none of their class in the United Kingdom.

The Institute has been fortunate this year in obtaining a building of suitable character for its display, for, although rather low-pitched as regards the roof, it is light and cheerful, perfectly straight, and so arranged that no exhibit can be lost sight of. The exhibits are divided as usual into five classes—viz., construction and machinery, sewerage and water, heating, lighting, and ventilation, personal hygiene, foods, and disinfectants, and a miscellaneous class. Each class again is subdivided into sections, the whole having been arranged under the direction of Mr. E. L. Box, the able curator of the Institute.

The three well-known Sanitary Paint Companies are each represented by well-arranged stands—viz., the Albissima Paint Company, Limited, London, the

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Paint Company, Limited (Messrs. Griffiths, & Co., Liverpool and London), and J. B. Orr & cate Paint Works, Charlton, London, S.E., the rection of the Albissima Company being, as usual, g feature. The productions of these firms have frequently the subject of comment that there is resh to add to previous descriptions, excepting learn with satisfaction that all the companies be increasing in popularity, and that the public, a rule to be convinced in the matter of sanitary nents, are gradually grasping the idea that any an now be obtained in innocuous paints, and disagreeable ordeal of house-painting may be without danger to health, and with scarcely any le smell.

er firm closely allied to those above mentioned, in ary character of their exhibits, is Messrs. William s & Co., High Street, Marylebone, London, who ent with their usual assortment of non-arsenical ngings, and pigments for decorative purposes, free enic. The excellent designs shown by Messrs. s always render their stand attractive to the nd to enforce the conviction that there need be r to health even in using the commonest wall- amples are shown of many machine-made papers, arsenic, that can be purchased as low as 9*d.* per welve yards.

. Fred. Walton & Co., Limited, Berners Street, make an interesting display of their speciality s 'Lincrusta Walton,' to which also attention directed in these columns on previous occasions.

. Doulton & Co., Lambeth, occupy three distinct hich are not so extensive as usual, but are fairly ative of their three principal departments: viz., e, sanitary fittings, comprising all kinds of cocks, d plumbers' goods, and fine art ware. Their ecialities are on view; but the only notably new a new mode of connecting brass with lead, as, for where a cock or valve has to be attached to a . Hitherto, as our technical readers are aware, en effected by an ordinary plumber's, or 'wiped' connection, but in Messrs. Doulton's improve- hough the two metals fuse at very different tem- this difficulty has been overcome, and an amal- has been obtained that does away with the nsightly connection, and at the same time makes and much more secure joint.

and earth-closets and the appliances in connection are in great variety, and there are certainly some inventions amongst them, besides one or two vel, and perhaps 'extreme' ideas. Amongst the at are well known may be mentioned the 'Car- of W. P. Buchan, of Renfrew Street, Glasgow, exhibits the well-known traps and other sanitary h which his name has become so extensively con- Another stand is devoted to an extensive collec- s patent exhaust induced current fixed ventilators styles, for churches, schools, public buildings, stic dwellings, the principle of which is univer- wn.

ription of one of Mr. Buchan's appliances will in our remarks on Messrs. J. & M. Craig's ho are the sole makers of them. Mr. Buchan selected by the committee to remodel the closets ibition building, to which he has attached his appliances, and the old pan closets have been and his popular 'Carmichael' wash-downs fixed lace, which has added much to the comfort of the rrangements.

. Fairbairn, Melville Place, Edinburgh, exhibits burgh protective water-closets, urinals, and si- hich were mentioned in the SANITARY RECORD 15, 1883. To these is added a water-waste on the siphon principle, worked, however, with ock, but with an arrangement by which the action hon can be stopped at pleasure and the supply of water to the pan regulated to any quantity, preventing an unnecessary waste. Drawings of one of the closets

and urinals are appended. The closets possess this important feature, that the traps cannot by any possibility be emptied, provision being made for an effectual seal to both upper and lower ones, and, the closet itself being virtually a wash-out one, there are no valves or any other fittings to get out of order. Another feature of importance in the closets is that they can be made to siphon as easily with one gallon as with a larger quantity, and they can be fitted over old appliances.

The 'National' and 'Crown' water-closets manufactured by Mr. Thomas Twyford, Hanley, Staffordshire, are shown by his agent, Mr. W. B. Morrison, of Eglinton Street, Glasgow. No better proof of the value of these

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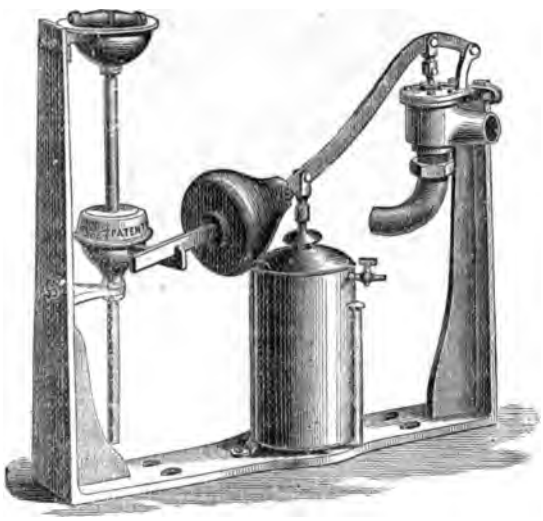
appliances can be mentioned than the continued favour accorded to them by (to some extent) rival firms, for they are to be seen amongst the collections of other sanitary engineers in the exhibition, who recommend them in preference to others, and attach to them their own fittings and water-waste preventers. A very choice collection of tiles, suitable for baths, lavatories, dados, and other ornamental purposes, are shown on the same stand from the works of Josiah Wedgwood & Sons, and comprise specimens of most of the styles now popular, as well as reproductions of some of the once noted chinas. There is a refinement of tone and colour in many of them not always seen in kindred productions, and the hand-painted examples show in most instances decided originality in design.

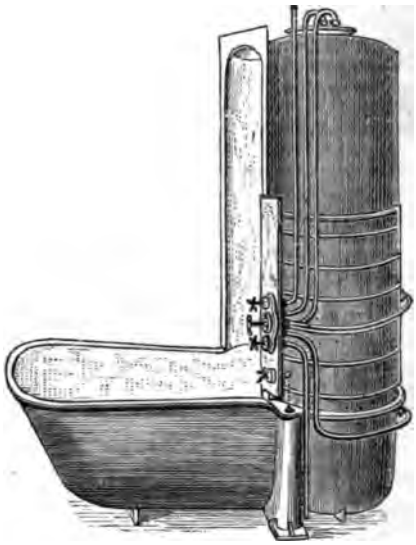
One of the most simple and effective arrangements, shown for the prevention of water waste in connection with closets, is that of Mr. Wm. Ross, St. Vincent Street, Glasgow, whose suction-valve (of which he is the original inventor and patentee), as applied to this purpose, has been before the public for some three or four years, and the use of which has been sanctioned by, amongst others, The New River Company, and East London Water Works, Glasgow Corporation, &c. The valves (of vulcanised India-rubber) can be applied to any kind of closet, and be used, as shown in the accompanying drawing, without the small supply cistern, the water coming from



the house tank or direct from the main, yet the action of the simple valve shown on the left-hand side of the engraving secures the delivery of a certain amount of water each time the handle is raised and no more, and it can be set to deliver any quantity required. The illustration represents the attachments to the closet under the seat. On lifting the handle the valve is drawn up, and the water begins to flow, and whether the handle is dropped instanter, or held in the hand until the lower part releases itself from the suction-valve, only the required quantity of water passes. The arrangement is so simple that it can scarcely fail under the most adverse circumstances, and should last for many years without cost or trouble. Already there are some thousands of them in use.

An interesting collection of sanitary appliances is shown by Wm. Moyes & Sons, Pollokshields, Glasgow. Among them is a flush-out closet of a more than usually extended area at the top. This is so made that it may be used as a slop-sink for the chamber water, and the seat being hinged, is lifted up, exposing the full surface for this purpose. Another improvement is that there are no perforations in the rim, but the fan distributes a good flush over basin and trap, being drawn to a focus at the front directly over the outlet, down which it rushes with great force. Another 'departure' from the orthodox plan adopted by this firm consists of an ornamental wood casing of open fretwork, which allows a free current of air to be constantly passing through it, communicating with the outer air. An improved self-trapped flushing rim urinal also possesses meritorious points. A new disconnecting and ventilating chamber for waste-pipes will prove a useful addition to our stock of such appliances. It is of circular frontage, perforated all over with small holes, and is intended to cover the space that is usually left from where the outside pipe that carries off the surface water ends, and the entrance to the drain pipe from the ground level. The advantage gained is that instead of water as it falls splashing around and in winter often becoming frozen, it is confined within the area of the perforated chamber, avoiding all nuisance, and providing a finish to what is at best an unsightly feature. At the same time a free current of air is allowed to pass between both pipes. The bath and lavatory fittings shown by Messrs. Moyes & Sons are well made, and contain some decided improvements.

Messrs. Shanks & Son, Tubal Foundry, Barr Head, near Glasgow, are well represented with their most noted specialities. A prominent feature in the collection is a handsome combination bath. We append an illustration of the bath without the outer casing. It is elaborately mounted in French-polished mahogany, with tiles at the side and bevelled plate-glass panels. The shape of the bath is an improved one, being made with a large circular end and canopy *en suite*, which causes the spray-jets to converge to the centre, while ample room is at the same time secured to the bather. In this bath the fittings are much simplified; and instead of the many valves to which we have hitherto been accustomed for providing the different descriptions of baths, we have only



three—viz. hot, cold, and waste, with the exception of a dial with a finger, the moving of this to defined positions producing the spray, shower, douche, &c. Complete as this luxurious appliance has been made, the makers are prepared to supply it at a very moderate price. Several other baths, beautifully enamelled, show in each case a slightly different arrangement in connection with the supply. It may be noted that it is to the inventive powers of the Messrs. Shanks that we are indebted for many improvements in the supply arrangements of our household baths—improvements that are now almost universally

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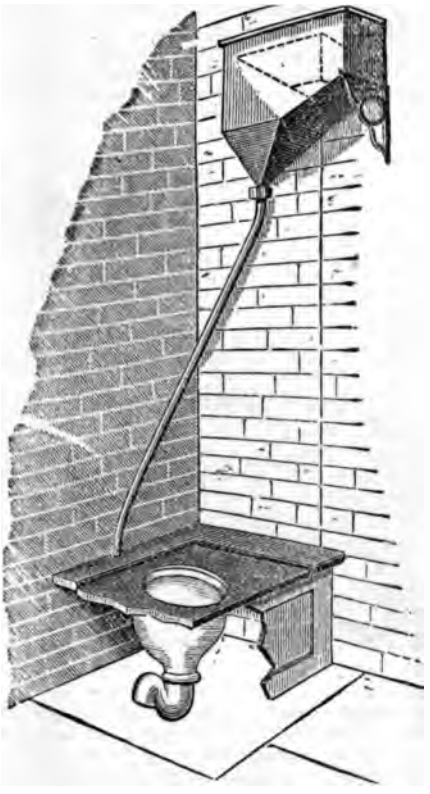
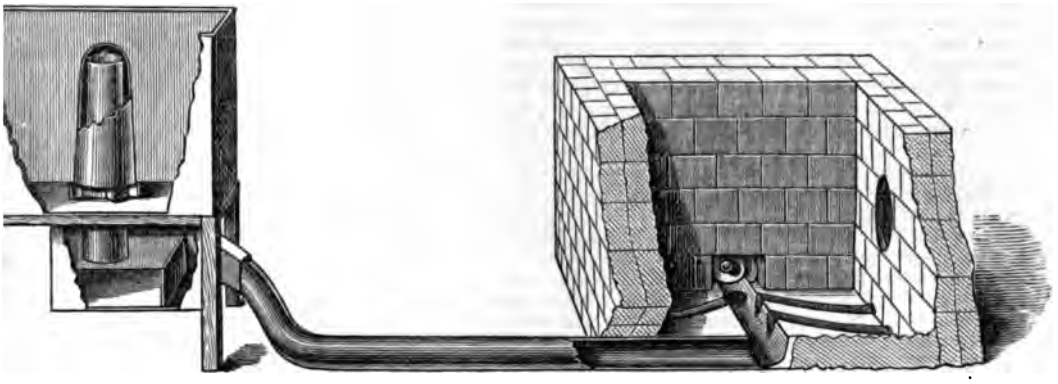
l, other makers having endeavoured to assimilate
i their own fittings on somewhat similar lines. The
e also fairly represented in lavatories; and here
ire found improvements worthy of note. For in-
the waste-pipe is solid with the basin, the whole
nade of one piece of earthenware, preventing
: and saving expense in fitting, and the waste-valve
:ts as an overflow. The firm likewise exhibit
closets and water-waste preventers, and it is almost
s to add that all the fittings are of the best class of
inship.

James Stewart, sen., 84 Norfolk Street, Glasgow,
lting sanitary engineer of considerable repute, and
ntributed a paper to the Congress, an abstract of
will be found at p. 184, makes an important show
tary drain pipes, traps, grease and other inter-
, which is the more interesting because it brings
r in one exhibit the leading inventions of the prin-
anufacturers of these goods. Kenon's Patent Air-
rap, Mansergh's External Drain Trap, Doulton's
i Ventilating Trap, their Mud Interceptor or
Trap, Lathom's Intercepting Trap, and several
)f Messrs. Doulton's make are here to be seen, also
ating drain trap of Mr. Stewart's own invention,
:ld's Six-inch Drain Siphon Trap, and Belham's
ch Ventilating Trap, nearly all of which have been
:d in our columns on previous occasions, Messrs.
Sons' principal traps, including Weatherley's,
's, and Houghton's Improved Court or Area Gully
ind their excellent interceptor for solids described
SANITARY RECORD of June 15 last, and several
)f commendable utility, all of which Mr. Stewart
the different systems of drainage he from time to
.rries out. One of the leading features of the
illustrated below, and which will be readily
)od, is a 'Field's' 30-gallon patent self-acting
lush tank in connection with a disconnecting and
on chamber with 'Field's' curves. This chamber
to a level with the ground, is lined with white
bricks, and when fixed for use is covered with a
i lid. These appliances form one of the best
)f flushing house drains extant, and will no doubt

an ordinary closet. The action is thus obtained: a common water-tap placed over the tank is turned on to any



extent that may be deemed necessary, and this running into the tank fills it in a given time. Immediately it is



ly used in the future. The great advantage of the
lious inspection chamber is easy mode of access to
the clean manner in which it can always be kept
ninimum of labour.

. B. McCallum, C.E., F.M.S., Borough Engineer
Corporation of Blackburn, exhibits specimens of
:w Tipping Tank Cisterns of his invention which
:o have commendable features. They are simple
ruction, and may be relied upon for doing their
'ith certainty and efficiency; and, the supply of
:ing under complete control, waste need not occur.
e adaptable to a single one, or a range of closets
ls. We append an illustration of one attached to

full it cants over and discharges the whole of its contents into the pipe, and so performs its flush. There is actually no difference in the action of this invention over a siphon flushing tank, as each discharge their contents when full, and the arrangement appears to resolve itself into that of individual fancy. Each can be worked either with or without a ball-tap, and probably many would prefer this invention to that of the siphon. They can also be made with a seat action, a pull action, and, in the case of urinals, with the pedal arrangement.

One of the most remarkable exhibits is shown by Messrs. E. & A. E. Gilbert, of Carphin Broughty Ferry, Forfarshire, and is calculated to upset all our preconceived ideas

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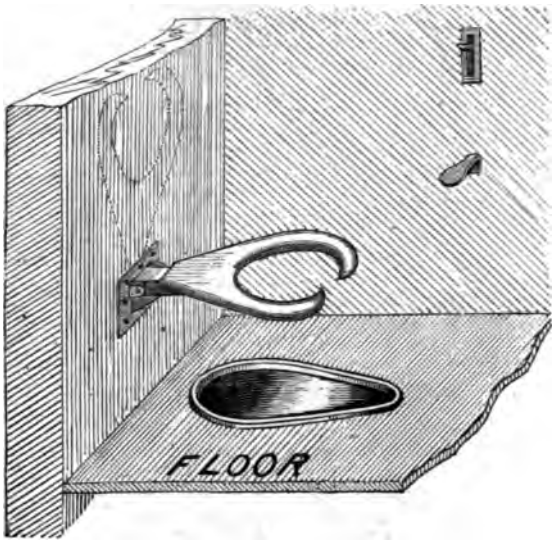
as to the arrangements of our water-closets. At first sight many may be inclined to look upon it with disfavour, but a little consideration will convince the impartial observer that there is considerable merit in it, and the judges, who spent some time in examining it, have granted it a certificate of merit. The one exhibited (an engraving is appended) is an early production, and already improvements are contemplated in the formation of the pan, which is here shown as sunk to a level with the floor.



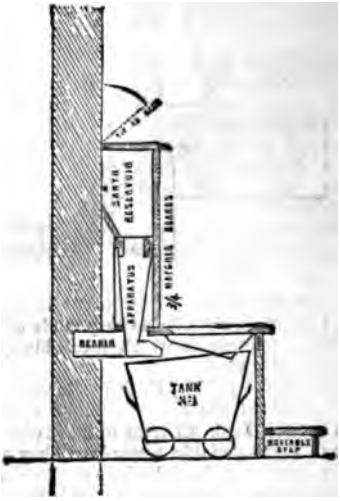
As the illustration so clearly depicts the arrangement, it is unnecessary to further describe it beyond saying that the seat is of wood, and sufficiently large for its purpose. The idea of the inventor is that, while applicable to private dwellings generally, it is more particularly so for railway stations, hotels, schools, on shipboard and in any place where such conveniences are requisite for the general public. Any person looking at the illustration will at once grasp the aim sought to be attained, which is cleanliness and perfect freedom from contagion. Those who are acquainted with these conveniences at the places designated will at once see that a public scandal and frequently disgusting sights, would be removed by the adoption of the improved seats, which do not require any particular shaped pan, the only necessity being that it should be sunk part way at least in the floor. The supply of water for flushing is arranged for at the side, shown in the upper of the two dark figures, and is brought into use by merely drawing down a small handle. The seat, which is hinged, can be entirely thrown back if required, as shown by the dotted lines, and here again the reason of the arrangement must be left to the imagination of the reader. Those who feel interested in the invention should communicate with the patentees, who will initiate them more fully into the details of the arrangements than can be done in these columns. The patentees are prepared to grant licences to any firm to manufacture the new appliance, and it is stated that arrangements are already in progress to supply it to certain railway companies.

Messrs. Walter Neilson & Co., Park Foundry, Paisley Road, Glasgow, send a few sanitary fittings, such as water gullies of improved construction, an enamelled steel commode suitable for ships' use, washhand-basin with connections and some cheap and simple urinals of cast-iron enamelled.

The British Sanitary Company, Bothwell Street, Glasgow, exhibit their patent self-acting earth-closets, which, amongst many other awards, received the medal of the Sanitary Institute at their meeting at Newcastle-on-Tyne. We described and illustrated this form of earth-closet in the SANITARY RECORD of Oct. 15, 1882, and repeat the illustration, but it may be again noted that its chief feature of difference to others lies in its being

fitted with a perforated shovel, which is brought quickly forward by the seat action when the user rises, and spreads the earth more uniformly over the excreta than is effected by the ordinary processes.

Another firm exhibiting earth-closets rather extensively is that of Mr. R. R. Heap, Park Street, Greenheys, Manchester. Although we are not prepared to say that Mr. Heap was the original inventor of the earth-closet, he certainly made his appearance as a maker almost simultaneously with the first introduction of these appliances, and he has carried on a successful and constantly-increasing business in them since their introduction. The over-populated towns of the Midland and Northern districts, particularly those away from the sea coast, where the 'midden,' or pail system has to be adopted, have offered facilities for the introduction of earth-closets that have greatly increased their sale, and induced their adoption in many public institutions, such as workhouses, infirmaries, &c. At the present moment Mr. Heap is supplying a large number to the Burton-on-Trent Workhouse, but many mills, factories, and so forth, have had them fixed in preference to any other from a sanitary point of view, and there is little doubt that from this standpoint they are as a rule a far safer apparatus to have in use, particularly where large numbers of people are



congregated, than the class of water-closets or other systems generally adopted. Mr. Heap manufactures these closets in a variety of different forms and qualities, of which we append a few illustrations. Our first is a sectional view

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h is common to all, and consists of an earth reservoir torage, the hopper, or 'apparatus,' as it is marked on plan that holds the working supply, the seat, which) arranged that by sitting upon it, it is depressed, on rising, and in connection with two levers on which its, a charge of earth is distributed over the excreta. seat action is the most simple and effective. Being ely automatic not anything is left to chance, and no can use the closet without the distribution of earth ig place. The subjoined engraving shows the closet ie of its simplest forms, and only requires the tank or

voir, shown in the sectional drawing, to make it com- . This class of closet is made of ordinary deal, and e supplied at a very low price. From this quality are made into various higher grades until we reach French polished mahogany example as illustrated . To assimilate it as much as possible to the odox' closet, this is fitted with a 'pull up' handle, a water-closet, and is in every other respect equal in

rance to a high-class water-closet. A recent patent . Heap's, called a 'separator,' also illustrated, has uced the earth-closet to us in a new phase, and one s calculated to obviate an objection hitherto urged, other respects to prove a benefit. This consists of amelled trough, fixed in the front part with a grating ttom, and the urine, instead of passing into the ctor' as it has hitherto done, is, by this arrange- diverted, and is carried by means of a pipe into r channel, where it may be collected for after- ation for manufacturing purposes, or allowed to run bed of dry earth, which renders it a valuable ammo- manure. At all events, it prevents a quantity of liquid filling up a space for which there is no necessity, and rendering an almost constant emptying necessary. With this addition the earth-closet becomes one of the most complete available *media* for the disposal of human excreta, reducing inconvenience to the smallest limits.

J. & R. Howie, Hurlford Fireclay Works, Kilmarnock, send a collection of their goods, including white enamelled sinks, enamelled cisterns, and various ventilatting and other traps, and drain-pipes. Of the latter they show one of an extra strong quality with a patent joint, which is especially adapted for conveying water under pressure. A patent terra-cotta chimney can, for effectually curing down draught, is worthy of notice.

Mr. Henry Blair, of 68 Bath Street, whose 'Patent Disconnecting and Ventilating Soil-pipe Stench-trap' was recently illustrated and described in the SANITARY RECORD, has put up an erection representing the side of a house with soil-pipe and connections attached to show its applicability in practical use. As its prominent features have already been pointed out we will merely mention that it combines—as the name implies—a ventilator and stench-trap in one. The grating is formed by vertical slits around a cylinder a little larger than a soil-pipe, at the foot of which it is fixed, intercepting it and the drain; its liability to become choked with gravel or other matter is therefore reduced to a minimum, in fact is almost an impossibility, and as such is infinitely superior to the flat grating. The soil-pipe being continued to the roof and left open at the top acts as a long funnel; the air entering the grating induces a continued upward current and insures a thorough ventilation of the drain.

Mr. H. Percy Boulnois, the borough engineer of Portsmouth, shows specimens of Boulnois & Hilder's patent 'Acme' sewer-pipes. The idea of this invention is an improved method of simply and effectually laying and jointing sanitary pipes so as to make perfect and clean water-tight joints. The flange is only continued half way around, and the spiggot end has a corresponding portion cut away, so that when the pipes are laid there is a considerable aperture at every joint which is covered by a flanged cap and keeps it quite rigid. It will thus be seen to possess several important advantages over the common pipe amongst which may be mentioned the following. The pipe may be *dropped* instead of *pushed* into its place and so secure a perfectly true invert. The caps may be left off until the last moment, enabling the inspector to see whether the joints are water-tight, &c., while each joint is literally an inspection opening and any length of pipe can be removed without disturbing those adjacent to it. The under side of pipe is also made with a rest taking all weight off the socket.

A. T. Angell, 144 Fulham Road, S.W., shows his patent lip siphon trap, and patent air-tight manhole cover, for which he was awarded a certificate at the National Health Society's Exhibition in June, when an illustrated notice was given of it in the columns of the SANITARY RECORD. It is very simple, and the method adopted for rendering it tight is such that it will stand the maximum amount of wear and tear without becoming leaky. Illustrations and prices of both of these will be found in our advertisement pages.

Messrs. J. & M. Craig, Hillhead, Kilmarnock, show to advantage in their several specialities consisting of sanitary stoneware, and fire-clay appliances. A prominent feature consists of a collection of white enamelled sinks and wash tubs, and white and coloured glazed bricks. The sinks and wash tubs are coming largely into use, and their cleanly appearance, and the ease with which they can be kept clean is one of the leading characteristics in their favour. It is claimed by the firm that owing to the high temperature at which they are fired, and certain peculiarities in the process of making, the enamel is thoroughly incorporated with the body of the clay, enabling them to withstand exposure to all weathers. Messrs. Craig are the makers of Mr. Buchan's several specialities adverted to in another part of our report.

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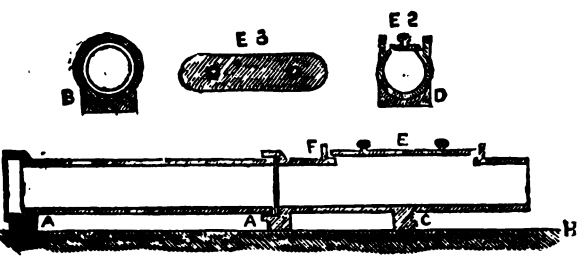
Amongst these we may mention his patent grease trap, so formed as to allow the waste-pipe from the sink to be ventilated, while preventing smells from the grease-box returning to the house. Another point of vantage is that there are no dip pipes in the grease receptacle, which renders the clearing away of the fatty matter an easy process. Perfect access is also provided to both house and drain ends of the trap independent of the grease



receptacle opening. This firm are also the sole makers of Maguire's safety joint drain pipes, here exhibited, which have been illustrated and described on former occasions in the SANITARY RECORD, also of Pott's patent Edinburgh air chambered sewer-trap, an invention of deserved repute. A variety of other sanitary goods, embracing drain-pipes, grease-boxes, gulley-traps, &c., help to make up a very meritorious exhibit.

The Pennycook Patent Glazing and Engineering Company, 581 Renfield Street, have an erection illustrating their patent system of glazing, and its adaptability for both straight and curved roofs. The sash-bars, in which the patent consists, are constructed of sheet zinc, copper, or other metal, in combination with narrow strips of sheet lead; these latter are simply folded down upon the glass, and keep it in position. The section of the bars is very small, so as to cast but little shadow or obstruct little light; yet they are strong enough to dispense with all woodwork except purlins, which are only required at distances of from 5 feet to 8 feet apart. It will be readily understood that glazing carried out under this system is extremely economical, as any boy can put the glass in; while the saving in time is immense and broken panes can be removed and replaced without the slightest fear of damaging those surrounding them. It has been used for several large public buildings, and is, we are informed, becoming very popular.

Messrs. J. Cliff & Sons, Wortley, Leeds, send an assortment of their art terra cotta ware, ornamented and plain tinted glazed bricks, &c. The porcelain sinks and baths made by the firm are also shown, and the latter are particularly worthy of note. They are the lightest of the kind in the market, while the quality of the material used is such as to ensure their being of sufficient strength. They are lighter than many which have come under our notice, and the finish, in common with their other exhibits, is up to the usual standard of this firm.

Messrs. Muir, Ewing, & Co., 280 Great Western Road, Glasgow, show a new departure in baths, sinks, &c. They consist of slabs of polished Sicilian marble set in strong fire-clay concrete. Specimens of marble floors are shown, which appear to be of excellent workmanship.

T. Heame W. Harrison, Esq., A.M.I.C.E., & Co., 21 Harrington Street, Liverpool, has a novelty consisting of a sort of porcelain and terra cotta cap for joining metal and earthenware pipes together. It undoubtedly makes a sound joint, but appears to take up more room than could be easily spared in some positions.

Mr. J. Binnie, Gartcosh, and 69 Bath Street, Glasgow, shows samples of salt-glazed sewer-pipes, invert blocks for channels of built sewers, gas retorts, fire-bricks, and other fire-clay goods. The special feature of this exhibit is the quality of the 'Gartcosh' fire-clay from which all the goods are made. The workmanship is also excellent, and worthy the medals and certificates it has upon many occasions received.

Mr. Daniel Emptage, Dean Hill Sanitary Works, Margate, has introduced a new pattern lead trap to obviate some defects possessed by those now being so largely used; we refer to the Du Boise patent lead traps and bends. It is made in the same way as the latter, the difference being in the shape or bend, which is so contrived that Mr. Emptage claims that it will hold its seal secure after having passed a quantity of water, where the half S or three-quarter S would have become untrapped. (See p. 187).

J. Hall & Co., Stourbridge, send a few samples of glazed bricks and one of their porcelain baths. The latter is enamelled on the outside and requires no wood casing.

Mr. T. Goode Messenger, Park Road, Loughborough, Leicestershire, has recently patented a water-waste preventer, as depicted in the following engraving, and is shown here in action. This water-waste preventer

is on the siphon principle, and differs from many other good ones now in the market in minor details only, and with them possesses the advantage of a full and direct flush discharging a uniform quantity at each time, no valves to get out of order, and an absolute prevention of waste. Some very good valves for hot-water heating pipes and other purposes are shown at this stand, and have no insignificant claims for attention. Perhaps the most salient feature in these is that the working parts are on the outside, and therefore free from the action of the water and not liable to get set fast, while they are easily accessible for oiling, &c. The valve is also full bore, can be opened, closed, and regulated with the greatest accuracy, and when closed is perfectly tight. These valves have been in the market for several years, and the demand for them testifies to the estimation in which they are held.

Mr. R. R. McKee, 341 Port Brae, Kirkcaldy, is also showing flushing apparatus, but of a different character to what we have so far been describing. One is for flushing sewers periodically and automatically, and another is shown that can be so fitted that it will periodically flush the smaller drains in connection with private dwellings, hospitals, &c. The invention is quite recent, so that but few have been fixed, but some flattering testimonials have been received from those surveyors who have given them a trial.

A. Durand Claye, Ingénieur en chef des Ponts et Chaussées, 69 Rue de Clichy, Paris, shows various books upon sanitary matters, engineering, &c., and two framed drawings representing respectively the development of the frontier parts of the Seine and Oise departments, and a view in detail of the quarters in which typhoid fever epidemic prevailed during September and October 1882.

John Robertson, 412 Vincent Street, Glasgow, shows drawings suggestive of improvements for the arrangement of soil and waste pipes, &c., in dwelling-houses and public buildings.

Mr. Chas. Gay Roberts, of Haslemere, Surrey, exhibits his ingenious invention for the separation of rain-water, intended to obtain pure water from roofs, and was first

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exhibited at the Sanitary Exhibition at Newcastle in Oct. 1882. On the recommendation of the judges it was submitted to a prolonged trial, and a medal was awarded to it in July 1883. It now obtains a certificate for improvements that have been introduced within the last twelve months. It is exhibited in a very compact form, and provided with a simple means of adjustment by which the same separator can be adapted for use either in a smoky town or in the country. The rain that first falls upon a roof brings down from it all the soot, bird-droppings, and other impurities that have been collecting since the last shower. Under ordinary circumstances these are all carried into the store-tank. The rain-water separator has no resemblance to a filter. All former contrivances for obtaining pure water from rain have attempted to remove dirt from the water after it has been stored. The separator is a self-acting contrivance for preventing the water while it is dirty from entering the tank. It is balanced upon a pivot in such a way that it allows the first portion of the rainfall that washes the roof to run away down a waste-pipe or into a foul-water tank. At the end of a given time (from three to nine minutes, according to the adjustment of the apparatus) the separator turns upon the pivot and directs the pure water into the storage-tank. Fig. 1 shows the exterior of the separator.

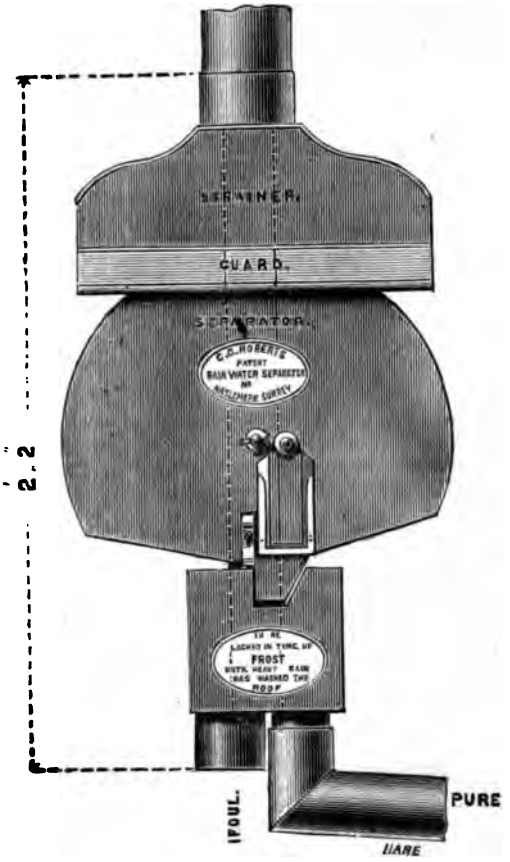

FIG. 1.

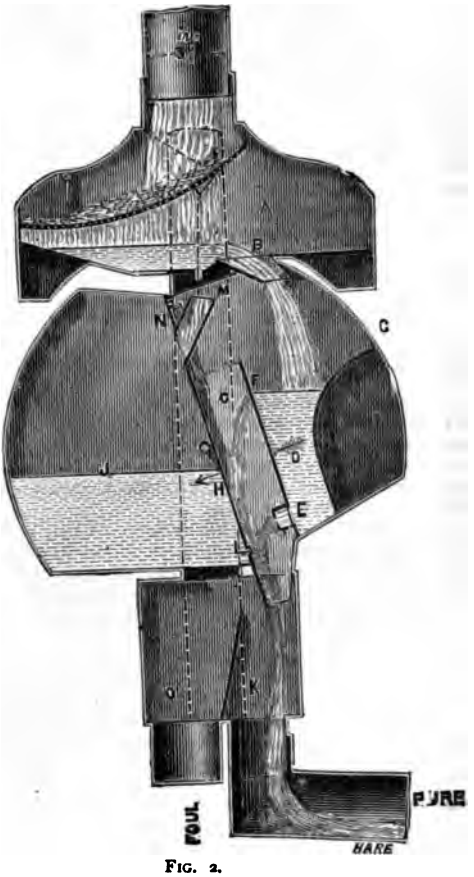

FIG. 2.

It is constructed of zinc, and is from 14 to 18 inches wide. It is easily fixed by an ordinary workman to the side of a house in any convenient place between the roof and the tank, part of the stack-pipe being removed and the separator inserted, so that the water passes through it to the tank. Fig. 2 exhibits a sectional view of the apparatus, and will serve to make its principle of action intelligible. The upper part of the illustration is merely the strainer, with a perforated plate to prevent rubbish passing into the separator. 1st Action.—The separator is divided into two compartments. The first into which the water falls has a small hole at the bottom (proportioned in size to the area of the roof), through which the water passes into the discharge-pipe, and runs normally to waste, or to a separate tank. When the rainfall exceeds the discharge through this hole, the water rises in this compartment till it reaches a small hole, through which it flows into the second compartment. This compartment fills very slowly, because the water escapes therefrom almost as fast through a hole at the bottom. When the second compartment has filled to a certain level, the separator is overbalanced or canted, so that the discharge is directed to the storage tank. 2nd Action.—If the rain is very heavy, the first compartment is filled to the top, and the second fills rapidly, so that the separator acts sooner in a heavy downpour than in a moderate rain. 3rd Action.—When the rain is leaving off, the second compartment is kept full by an auxiliary pipe, so that the separator remains canted after the water has ceased to pass from the first into the second compartment. By this means the last drop of rain is stored. Detailed description of the apparatus: A, removable strainer, with perforated plate to prevent rubbish passing into separator; B, outlet for water to pass to separator; C, separator balanced on pivot; D, small compartment, into which the rain-water first falls; E, small hole, fitted with washer proportioned to size of roof; F, larger hole to take the overflow D during moderate rain; G, discharge pipe. In a storm the water fills the compartment D, and flows over the top of this pipe. H, small holes at back of G, between compartments. When the rainfall exceeds the discharging

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capacity of hole E, the water rises in compartment D, and, passing through holes H, slowly fills compartment J. When the weight of water in J overbalances the separator,

FIG. 3.

it is canted (as shown in fig. 2), and the water (by that time pure) directed by the discharge pipe G into the storage pipe K. L, small hole at bottom of compartment M. J, auxiliary pipe for keeping compartment J full after the separator is canted, when the rain is leaving off, so that the last drop of rain may be stored. By raising the slide N (shown on an enlarged scale in fig. 3), a third and fourth hole can be opened at H; this will cause the compartment J to fill more rapidly. The whole of the water passes through the discharge pipe G, which conveys it into the waste-pipe P, so long as it remains uncanted in the position shown in fig. 1.

The length of time it remains in this position, running the water to waste, is regulated by the slide N to suit the smokiness of the locality. The dotted lines down the centre indicate the position of the iron frame to which the apparatus is attached, provided with holes for fixing to the wall.

The price of a separator varies from 1*l.* 15*s.* to 5*l.* 10*s.* for roofs of from 300 ft. to 5,000 ft. area. The apparatus being strictly self-acting and not liable to get out of order, it needs no other attention than an occasional washing. The first separator was sent out in 1879; it is fixed on a group of five cottages in Rogate, in Sussex. The purchaser left it to the care of one of his cottagers, who washes it about three times a year, drawing the centre part off the pivot for that purpose. It has needed no other attention, and is reported to be as good now as it was at first. A few have been fitted up in London and other large towns, but the separator is most valued in districts where well water is of bad quality or only to be obtained by sinking to a great depth.

Where there are several stack-pipes to a house these should be connected before the water enters the separator, either above or below ground. The separator may be put at the top of the tank, or in any convenient place between it and the main pipe. The water leaves the separator sixteen inches lower than it enters it; the surface of the water in the tank will consequently be only lowered to this extent when it is necessary to put the separator underground. In large houses it will often be found convenient to provide one or more of the stack-pipes with a separator for an upstairs tank, to supply water by gravitation to the kitchen boiler, or for other purposes, while the rest of the stack-pipes are connected underground with the large separator as described above. Both of these methods of fixing are shown in plate 4.

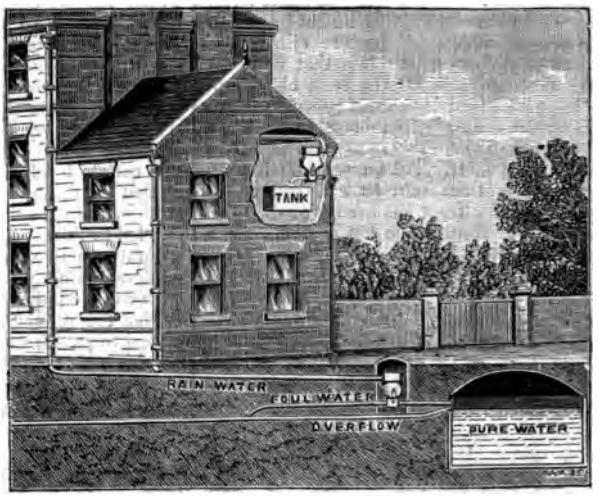

FIG. 4.

Messrs. J. L. Bacon & Co., 34 Upper Gloucester Place, London, and at Glasgow, Dublin, and Belfast, exhibit their system of heating and ventilating buildings of every description. An apparatus is at work on the stand, and conveys a very good idea of the power of which the system is capable. Although the pipes are small, they throw off a great deal of heat, and are easily adapted to the requirements of any building. The furnace is a small iron one, which requires no setting, and consumes very little fuel. There are some very pretty specimens of coil-cases and ornamental gratings, with the aid of which the heating apparatus can be made a handsome addition to the decoration of a house.

The great strength as well as the flexibility of the pipe used by Messrs. Bacon is shown by a coil surmounted by a double knot of pipe on which there is a gauge, showing a constant pressure on the whole of 4,000 lbs. per square inch.

The apparatus consists of wrought iron tubes of special manufacture, $1\frac{5}{16}$ in. external diameter and $\frac{7}{32}$ in. thick, the ends of which are provided with right and left handed screws. They are connected together by means of sockets, also screwed right and left hand, which draw the ends together and force them one into the other, thus making a perfectly sound hydraulic joint, as strong as the tube itself. This joint is not at all affected by expansion—a source of continual trouble and annoyance where the ordinary form of joint is employed—and offers the further advantage of allowing any tube to be disconnected and removed without the least disturbance to the rest.

The above illustration shows the full size of the tube, with a joint. It was first introduced by J. L. Bacon, and afterwards extensively used by other makers.

The larger portion of these tubes form the heating surfaces and connections of the apparatus; the remainder, an exact and fixed proportion, built in a furnace at the lowest level, takes the place of the ordinary boiler. The apparatus, therefore, consists of an endless circuit of tubes, *all of the same diameter*.

Thus constructed, the apparatus is charged with liquid, and closed by an automatic valve fixed in a cistern at the highest point—its object being twofold: to pass off the excess of liquid in the pipes, caused by heat expansion, and to re-absorb the same when cooling. The tubes are

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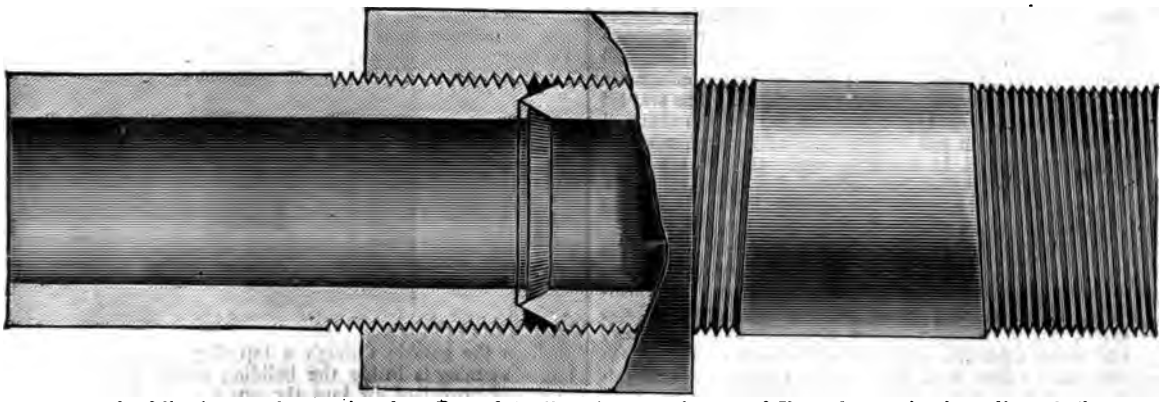
thus continually kept absolutely full without possibility of a higher pressure than that at which the valve is set, and which corresponds with the temperature the pipes are intended to develop. Formation of steam is impossible, as is also the stoppage of the circulation through air locking.

Amongst the advantages offered by such a system of apparatus, the following may be mentioned :—*Ease of Application.*—In consequence of the superior quality and small diameter of the tubes, and the facility with which they can be bent, the apparatus is equally applicable to old or new constructions, for it can be introduced without disturbance to existing arrangements, and does not necessarily entail the construction of trenches or channels for connection mains, an inconvenience in other systems often debarring their employment. The expenses, therefore, accessory to its introduction are very trifling, and as the circulation does not depend on the tubes being laid at a slope, the apparatus is not unsightly. *Simplicity of Management.*—The action of the apparatus being that of the simple circulation of liquid, induced by lighting the furnace fire, all the difficulties arising from condensation, air stoppage, and the consequent necessity for attention to valves and air-cocks, are avoided. The management is, indeed, so simple that it can be left to the care of any ordinary house servant. *Durability.*—The whole apparatus, when erected, is tested by hydraulic means to a pressure of 130 atmospheres, and since the valve is regulated to blow off at six atmospheres, it is manifest that leaks are of rare occurrence. Further, in consequence of the unusual character of the material employed, viz., *wrought iron*, breakage is impossible, even in the event of the greatest violence. Hence, the cost of maintenance, often such a heavy item, and so difficult to estimate in the case of other systems, such as steam, cast-iron hot-water pipe, or hot-air apparatus, is in the case of this system practically nil; instances have been known where apparatuses have been in use over fifteen years without entailing the least expense for repair. *Heating Capacity.*—The apparatus working under a valve, the phenomena of ebullition are avoided, and the heating surfaces can, by regulating the valve accordingly, be raised to very high temperatures without the formation of steam. The system is therefore peculiarly applicable for drying closets and stoves for manufacturing purposes where great heat is required, and where the ordinary system of hot-air flues is inexpedient, both on account of danger from fire and damage from noxious vapours. But since laws of hygiene forbid the employment of overheated metal surfaces for the ordinary purposes of heating, the apparatus is in such cases constructed so that the surfaces cannot exceed a mean temperature of 237° F., with the result, that while in every way obedient to those laws, the greatest possible effect is obtained from the tubes, and one considerably in excess of that obtained from other systems of circulating apparatus. *Economy of Fuel and Rapidity of Heating.*—Since in this system the ordinary boiler is replaced by a series of tubes, bent in tiers one over the other, and disposed in the interior of a furnace, the temperature of which tubes steadily increases throughout their length, a considerable economy of fuel can be secured by careful disposition of the tubes and construction of the furnace; for it is manifest that the temperature of the escaping smoke need only be slightly in excess of that of the return



pipes, or about 190° F.; whereas in the ordinary boiler, where perfectly free circulation is possible, and the temperature of the water is practically the same throughout, the heat of the flow-pipe governs that of the chimney. As the practical result, it may be mentioned that about 90 per cent. of the calorific power of the fuel consumed is actually taken up and distributed by the heating surfaces of such an apparatus; this is against 40 per cent. to 70 per cent. in the case of hot-water and steam boilers. Compared with cast-iron hot-water apparatus, another notable source of economy is obtained from the remarkably small amount of fuel necessary to raise the apparatus to its effective working point, *the proportion between the two being as* 1 : 8. This is in consequence of the difference in the weight of the materials used in each system for equivalent purposes.

Incongelability and Absence of Deposit.—It was formerly necessary to maintain fires during excessive cold, to prevent the water in the pipes from freezing; this was naturally inconvenient where otherwise no fire was required, and was subject to occasional failures. This inconvenience has, however, lately been entirely overcome—the pure water formerly used being now replaced by a patent non-freezing solution, perfectly inoffensive to the materials of the apparatus. The solution, once in the tubes, serves for an indefinite period without losing its effectiveness, since it neither decomposes, precipitates, nor evaporates under the action either of heat or cold.

Messrs. Bacon have special systems of ventilation which are applicable to buildings of various kinds, and they are prepared to make schemes suitable for any building either old or new. In large buildings a fan worked by a gas engine is generally used to extract the vitiated air, the fresh air being warmed before entering the rooms by passing over the hot pipes. This system has been largely adopted on the continent with great success.

The exhibit of Mr. Jas. Keith, of London, Edinburgh, and Arbroath, who, as a gas, hydraulic, and water engineer, is universally known, is one of the important collections in the exhibition. A new water-closet with some distinctive features, called the 'Automatic Ventilating Safety,' exhibited here for the first time, is worthy of attentive observation. The pan, trap, cistern for ball-cock, and overflow, are all of one piece of earthenware, and the closet is ventilated in no less than three separate places, viz., from the soil-pipe, or drain, the plunger chamber, and the side of the basin itself above the water-line. It is on the wash-out principle, and, besides the pan, contains a chamber for ball-tap, and another for a plunger which is formed of a cone of white earthenware

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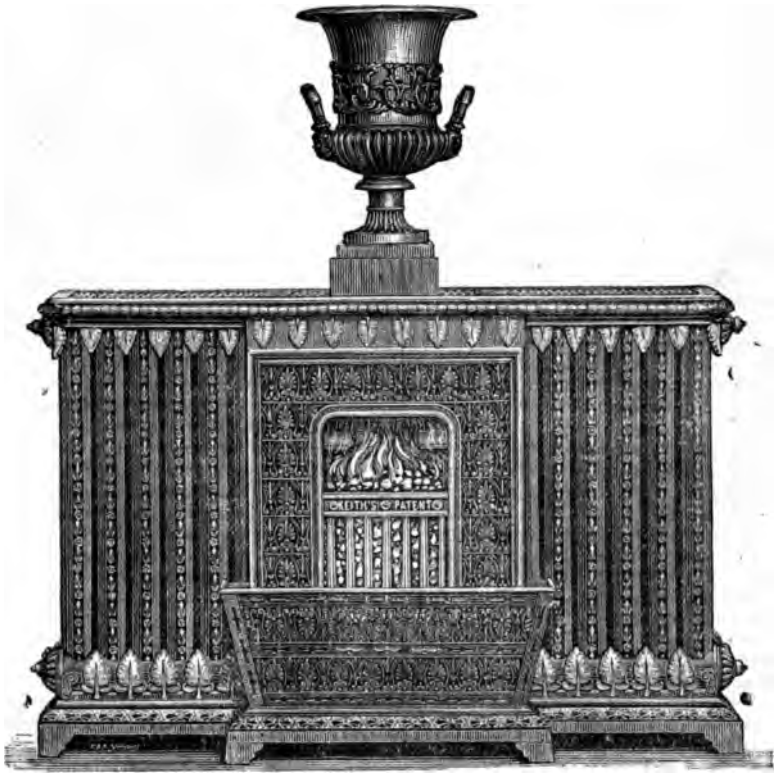
and India-rubber washer on bottom, connected with the pull-up handle; each chamber having communication with the other for the water to pass into them. It is not dependent on the supply cistern for its flush, as the water may be taken from the house cistern or from the main; and it permeates over the whole of the three chambers, securing, too, an entire change of water in each every time the closet is used. On lifting the handle the plunger is raised in its chamber, giving direct access to the outflow pipe; and an automatic water-valve inside the ball cistern is worked with only a pint of water, effectually sealing it and preventing hissing or leakage. The seat-lid being hinged, access to the whole of the parts is obtained instantly, and each can be readily cleaned or taken out if necessary; and it is this easy mode of access and its general simplicity that has secured the attention of the observer, while the ventilating arrangements appear to be of the most perfect character.

Mr. Keith's hydraulic rams and ram-pumps for raising water by its own action out of low-lying grounds or running streams to high elevations have a world-wide notoriety, and offer some of the best facilities extant for providing a water supply in country places, and under otherwise difficult circumstances. Mr. Keith also takes a front rank as a heating engineer, his 'Challenge' boiler having gained great popularity, both on account of its great heating surface, and the fact that it requires no brick-work setting; standing complete in itself. The firm also show to advantage in hot-water coil tables and hot-water apparatus with open fires, likewise complete in themselves, requiring only access to a chimney for a smoke-pipe, and of a most ornamental character. The coil tables are made to any size or shape, and may be had from a small one suitable for a vase or bust to any required dimensions.

Mr. J. E. Ellison, Victoria Square, Leeds, is showing, in addition to his own well-known conical and radiator ventilators — Stevens's patent exhaust ventilator and chimney tops, and a patent adjustment for opening and closing fanlights, &c., the invention of W. & R. Leggott, of Bradford. The conical ventilator admits the

air from the outside through a tapering aperture whose largest opening is inside the building which diffuses the incoming current of air into the apartments quite imperceptibly. The 'Radiator,' as depicted in the annexed cut, is composed of a flat disc—which may be either metal or wood and coloured to match the decoration of its surroundings—having at the back divisions placed crossways, which, on closing the ventilator, slide into a box fixed in the wall. The air by this arrangement enters the apartment under similar conditions as through the conical aperture, and so effectually prevents draught, and also admits of the air being introduced at the lower part of the room. Mr. Ellison is now making them to open and close with a rack and pinion, actuated by a loose key, so that



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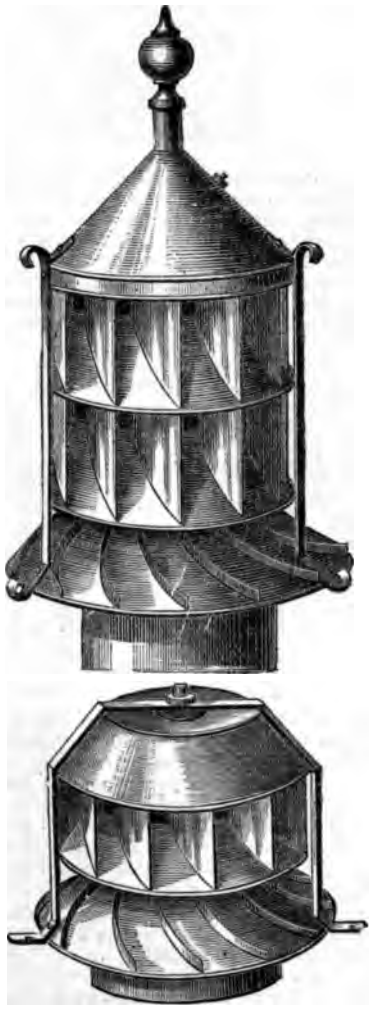
they cannot be interfered with by children or other irresponsible persons such as the inmates of asylums and hospitals.

The merits of Stevens's exhaust ventilators, shown by Mr. Ellison, and depicted in the following engraving,

can best be described by saying that they are very simple and low in price but answer the purpose. They are constructed upon the principle that at whatever angle the wind strikes the cone, a partial vacuum is created in the chamber, and a good up-current secured. The ornamental ones can be made to suit any style of architecture without interfering with their efficient action. Leggott's adjustment is an admirable adaptation of a rack and pinion and endless screw, and is actuated by means of a cord passing over a pulley attached to the latter. It works so smoothly that the heaviest window may be raised or lowered with the greatest ease, while, whatever position it is in, it remains always securely locked and proof against any tampering with it from the outside.

Messrs. Mechan & Sons, Neptune Works, Cranston Hill, Glasgow, show their patent Turning Gear for ship's stokehole and other ventilating cowls, the obvious use of which is that they may be easily and readily turned as the wind shifts, and thus secure a better supply of air to the stokehole and engine-room. It can be applied to one, two, or three cowls, acting simultaneously or independently, and may be worked by one man from the stoke-hole. Folding or tip-up lavatories for ship's use are also shown.

Amongst the exhibitors of exhaust ventilators for roofs, sewers, ships, &c., Messrs. J. M. Lamb & Co., of 119 Finchley Road, London, show to advantage with their 'Triumph' Ventilators. The illustrations accompanying this description depict a ventilator for roofs or sewers, and another for railway carriages. As a smoke cure for chimneys they have secured a great amount of success, are proof against the entry of rain or snow, and are guaranteed to be perfectly noiseless in the heaviest gale. They are of the rotating order, and are constructed on the most practical and scientific principles. They are made of any required diameter, and as exhaust ventilators can scarcely fail in their effect. While possessing the active principle of the best fixed cowl, they have the addition of a set of guides which conduct the air over the mouth of the fixed cone in a concentrated spiral form, and a revolving cone-head divided into segments that collects all the air with which they come in contact, twisting it over the mouth of the cone and condensing it to double pressure, making the centre of the ventilator the strongest point of action, and causing it to draw off the vitiated air on the off side. It is claimed that the exhausting power of the 'Triumph' ventilator exceeds that of any other ever invented, and only a powerful up-current can exist wherever they are fixed. The power can be increased to any extent by increasing the number of tiers of cones, each row clearing the row below it, and all revolving over a fixed cone exhaust-chamber. When once fixed they require no



further attention, beyond perhaps occasional oiling, as they work on a hardened steel spindle in a cup of the same material, lubricated with non-corrosive oil. From the successful manner in which these ventilators are acting wherever fixed, the inventors would appear to have a valuable property in their hands.

Messrs. Jas. McHaffie & Co., Calderwood St., Glasgow, exhibit Mann's Exhaust Ventilators, which are fitted with horizontal louvres, and for which it is claimed that they are proof against down-blow from whatever direction the wind strikes, and that rain or snow cannot enter them. An instantaneous water-heater, the invention of a Dr. Irvine, is also shown by this firm. It is a compact apparatus made of copper, and is calculated to heat two gallons of water per minute to 120 degrees.

Messrs. C. Kite & Co. make a very good display with their various descriptions of ventilators, chimney caps, &c., including a new design in the well-known roof ventilator.

Perhaps the latest improvement in ventilators for admitting fresh air into dwelling-rooms, school-rooms, fac-

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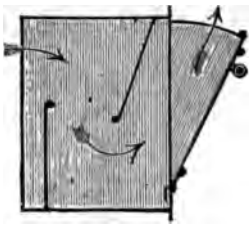
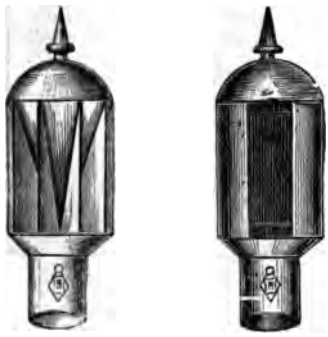
tories, or other buildings, is that as depicted in accompanying sectional engraving, from which it will be seen that, whatever be the force or direction of the wind, the air will be dispersed upwards at an angle, without causing



draught. It should be fixed from 5 feet to 6 feet from the floor, and when one of Kite's patent noiseless chimney breast ventilators is used in combination with it, a most useful system of ventilation results. They have each received certificates of merit.

The following sketches are representations respectively of Kite's inlet and exhaust drain ventilators. The principle of their action is very simple, yet thoroughly effectual,



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and we understand that the Government, after having given them practical trial are adopting them at all their depôts, including Portsmouth, Woolwich, Shoeburyness, &c., and they are also in use on the main drains at Brighton, Torquay, and other towns.

Messrs. Hill & Hay, Halifax, are also showing ventilators, their *spécialité* being known as the 'Excelsior Siphon Ventilator,' for which it is claimed that it answers all the purposes of outlet or exhaust ventilators, while it possesses the advantage of admitting fresh air so that the inlets usually fixed in the lower part of a building can he dispensed with.

The Æolus Waterspray and General Ventilating Co., 235 High Holborn, W.C., are also exhibiting their system of ventilation, and have specimens of the single and double horse-shoe Æolus exhaust-roof ventilator and ships' ventilators. The principle of the Æolus waterspray ventilator consists in inducing a current of air into the inner tube of a vertical cylinder by means of a fine spray of water, which acts with a continuous suction force. The air thus drawn in must find an exit, and one is provided for it at the top of the outer tube of the cylinder, so that it passes into the apartment thoroughly cleansed. We hope to illustrate and more fully describe this ventilator on a future occasion.

Mr. E. C. C. Stanford, Glenwood, Dalmuir, Dumbartonshire, shows specimens of disinfectants and sewage before and after treatment, and seaweed charcoal before and after use in dry earth-closets, illustrating the various chemical changes produced and the peculiar properties of seaweed charcoal.

In the gas section Messrs. J. Wright & Co, Birmingham, make a show that is not equalled by any other firm in the Exhibition either for variety or utility. It comprises hygienic ventilating stoves for gas and coke, cheerful warming stoves in numerous sizes, the Cosey gas fire for warming small rooms and capable of boiling a kettle as well, laundry and tailors' stoves, and cooking ranges in every size to meet the requirements of the smallest family or the largest restaurant.

The collection sent by Messrs. Waddell & Main, 261 Argyle Street, Glasgow, is also well worthy of note. It comprises gas hot closets, the Abbotsford heater for shops, offices, &c., the 'Cottage' gas oven, the 'Bachelor' cooker, and others of a similar character. But the great feature of this firm is their combination gas and coal range which was shown at the Smoke Abatement Exhibition and described in our report thereon. It is at once useful and economical.

The chief display of gas-burners, brackets, regulators, and other minor fittings are sent by Messrs. A. Brown & Co., 24 Gordon Street, Glasgow. When we say that the burners are of Bray's and Peeble's makes and the regulators by Stott, further comment upon their value is unnecessary.

Messrs. Allan & Adamson, 7 Bothwell Circus, Glasgow, have recently patented a gas stove that is likely to occupy an important position among its kind, and to prove a very significant competitor in the ranks of those who claim to solve the smoke abatement problem. That gas stoves in general contribute to a very sensible degree in mitigating the nuisance is obvious to all, but in even the best of them (excepting perhaps Cox's & Beynon's patent, and Giles' patent) a flue of some description is necessary to carry off the fumes and products of combustion if the apartment is to be kept wholesome and the air capable of being breathed. Such, however, is not the case in the one under consideration, and herein consists its departure from those now in the market. The means by which this is accomplished—and the principle is applied to both cooking and warming stoves—is by conducting the products to a chamber furnished with gills so placed that the products pass over them in a zigzag course. This, as it were, condenses them, and they issue into the apartment in a quite innocuous form; not, however, until they have passed through charcoal or other purifying medium as an additional safeguard. From an economical point of view they are also of considerable merit, as every unit of heat is utilised to best advantage.

The Adams Patent Gas-heating and Cooking Stove Co., Limited, 93 Hope Street, have introduced an invention that must rank in the same category as Cox's patent and Giles' patent, the object attained in all the three being that of either cooking or warming without the fumes, in the case of the former, coming in contact with the food, or in the latter into the apartment. The essential difference, then, between the one in question and the other two mentioned—seeing that the end obtained is the same in all—lies in the construction of the burner, which possesses the following features. The 'Burner' consists of fire-clay tubes, which become white hot, and emit an intense radiant heat, similar to that from a brilliantly incandescent coke fire. The gas is burned with only the quantity of air in contact with the burners necessary to consume the gas, and both gas and air are very highly heated before being burned; and a useful arrangement has also been devised whereby, when the desired temperature is reached, the gas of one of the fires is shut off, and at the same time the supply of air for the disused fire is also shut off, with the result of preventing an unnecessary stream of cold air passing along the flues and lowering the temperature of the stove.

A very useful and also a newly-invented apparatus, also exhibited at this stand, is Dr. Adams's Disinfecting Chamber. The advantages are that in it the clothing or other articles to be purified are not exposed to the products of gas combustion, and can be disinfected either by dry or moist heat, or by a combination of both. The temperature is regulated or maintained by automatic contrivance, so that articles are subjected only to a safe maximum temperature, and volatile contagious matter

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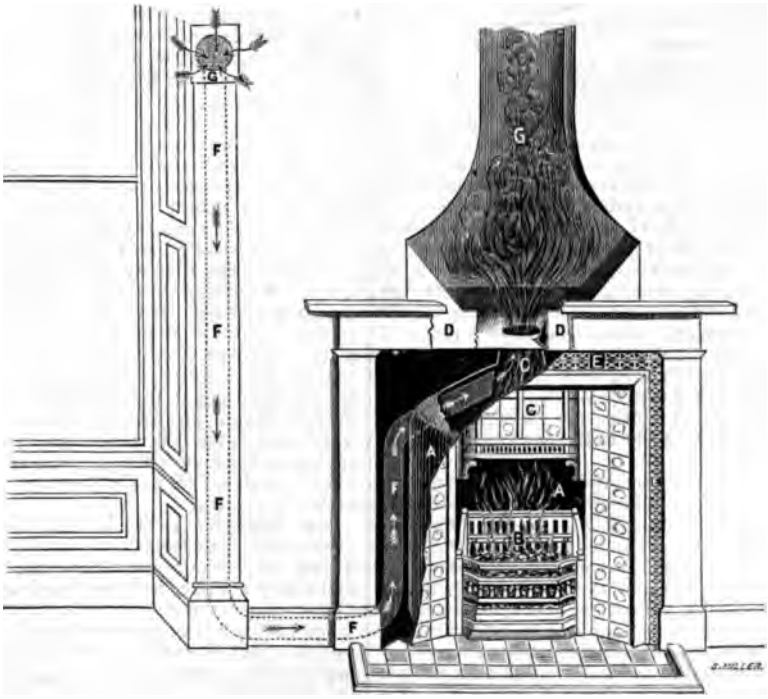
emanating from infected articles is not permitted to escape into the atmosphere, but confined within the chamber until ultimately destroyed by being drawn through the furnace. The amount of gas consumed is claimed to be considerably less than by any similar apparatus, and therefore possesses advantages from an economical aspect.

Though the entries of smoke-consuming register grates and kitcheners cannot be said to be numerous, yet it is satisfactory to note that the list includes some of the first and oldest manufacturers, and of these attention is especially due to the collection contributed by the Carron Co. Their exhibit comprises highly-finished Berlin-blacked registers on slow and ordinary combustion principles, and amongst these are some excellent designs; one with richly chased brass moulding and canopy and hand-painted tiles is particularly worthy of notice, and with kerb, rests, brasses, and majolica tile hearth complete, makes a very handsome suite; another example, with parcel-bronzed panels and canopy, is of very elegant design. Slow and quick combustion and smoke consuming hall and shop stoves well assorted, from quite inexpensive ones to those highly-finished Berlin-blacked and brass mounted with and without tiles, are on view. The ranges shown are of three kinds, the 'Beeton' portable close fire range with oven, boiler, &c., of a similar construction to the 'Wilson' but of a cheaper character; a combined open and close fire range with flues arranged for directing the heat to the top or bottom of ovens as may be required, and with overhead ventilators and other improvements; and a combined close fire and gas heating range with large baking and roasting ovens, gas ovens, hot plate, &c., like the 'Beeton' in that it is enclosed and requires no setting.

Mr. James Carrick, Buchanan Street, Glasgow, whose name must be familiar with many of our readers in connection with the late Smoke Abatement Exhibition, where he exhibited a somewhat novel arrangement in an open fire-grate, inclosed in a glass casing, the object of which was to give absolute control of the fire, to regulate its combustion, to protect the house against smoke, even a blow-down, the diffusion of dust, and at the same time to afford comfort and security. The salubrity of the air is not injured by the mode here adopted—viz., by exposing a large metal surface not to any direct contact with the fire, but solely to the action of its radiant heat. In connection with this grate he drew off the vitiated air from the apartment and brought in a supply of fresh warmed air from the outer atmosphere. The invention is again shown here, and, in addition, one without the glass-casing based on similar lines. We append an illustration of this grate, the action of which will be readily understood. The grate, which may be termed a 'semi-dog-grate,' lies open upon the hearth; but the entrance to the chimney is enclosed, excepting a six-inch opening. In any convenient part of the room an opening of the same diameter is made, and from this a shaft is carried to the bottom, and so on to the inlet of the chimney as shown in the drawing. The draught from the fire causes an induced current in the shaft, and the vitiated air from the apartment is siphoned down the shaft and to the chimney, both entering at almost the same point. Both openings being of the same diameter, no undue draught is exerted upon the fire, which burns freely and brightly without roar, and to compensate for the amount of air constantly being drawn from the room, a fresh supply, warmed by admission from the outside to a chamber at the back of the grate, is always entering it through the perforated openings around the front. The ventilating shaft need not be built up behind the brick work of the room, as an ornamental one can be fixed on the front of the wall, enabling Mr. Carrick's grate to be fixed in any house without destroying any part of the wall and with very little expense. As some of them are about to be fixed in London, the judges have decided to take exhaustive tests on one of them here, which will give a better opportunity of bringing out the merits of the invention than can be obtained in a temporary erection at an exhibition. Mr. Carrick also introduces another invention for which there should be a large sale, as being adapted for that large class of persons who live in apartments, and who have not the advantage of a kitchen in which to carry on their cooking. Attention has already been called to this subject, and, as an appliance suitable for a coal fire, the apparatus in question is decidedly the most simple and effective yet introduced. It is merely



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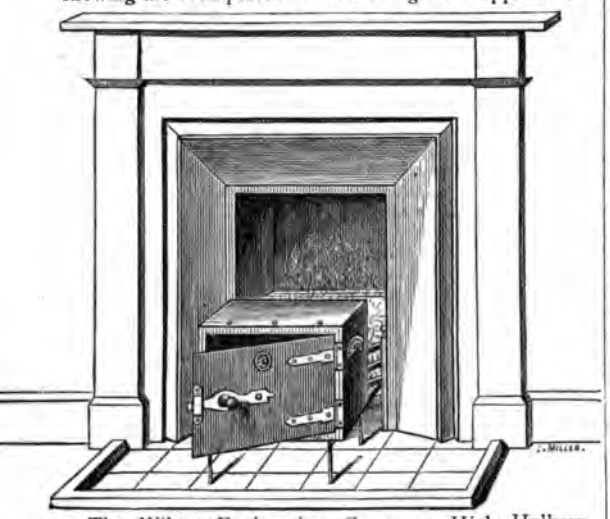
an ordinary sheet-iron oven, jacketed at the sides and top with a non-conducting material; and at the bottom at the back a perforated cast-iron plate extends along its length, projecting forward about six inches in a horizontal line. This oven resting upon any simple stand of the height of the bottom bar of the grate is placed before the fire, and the cast-iron plate is fastened forward between the bars. This brings the oven up to a level with the bars of the grate. The cast-iron plate soon becomes heated, and this coupled with what is communicated to the back of the oven from the fire quickly heats it, and anything that can be got inside it, whether meat, pies, or bread, is well and economically cooked, and when the operation is over the oven has merely to be taken away, and the fire assumes its ordinary appearance. A more compact and cleanly arrangement could scarcely be devised, or one more effective in its work. An engraving showing the oven placed in front of a grate is appended.



The Wilson Engineering Company, High Holborn, London, who are constant patrons of the exhibitions of the Sanitary Institute, are present with their well-known cooking apparatus, to which we have so often adverted. We have constantly to chronicle some addition or improvement to the Wilson ranges, and on the present occasion the company show a series of gas-burners enabling them to be used with either coal or gas, the one mode of heating being arranged not to interfere with the other. Under the hot plate are fixed ring burners, which are brought into direct contact with the culinary vessels by taking off the iron lid usually provided. The ovens have a range of burners carried round them as in an ordinary gas-cooker. Thus in the summer, when large fires are not necessary, the gas can be brought into requisition, or a coal fire can be lit without in any way injuring the gas-burners. This new addition will no doubt add to the popularity of these well-known ranges.

A new cooking range of a smoke-consuming character is shown by Messrs. Whyte & Bradford, Victoria Foundry, Bo'ness. The fire-basket, which is in the form of a horizontal cylinder, having several movable gratings on its circumference, is fed with the fuel from an opening left between them on the top. It is then gradually turned over by means of a lever, the openings being closed at the same time by pushing the gratings over it, until the fresh fuel arrives at the bottom, where the products have necessarily to pass through the red-hot mass and so become consumed. The effect is, of course, similar to that of a grate fed from the bottom, and it is decidedly a non-producer of smoke. There are meritorious points connected with it in the arrangement of the flues, and a good-sized oven is fitted underneath the fire, besides those at the sides, materially increasing its cooking powers. It has been awarded a silver medal, and we hope to give an illustration of it in our next number.

Messrs. Hydes & Wingfull, Limited, Stanley Street, Sheffield, have a first-rate display of the 'Tortoise Stoves,' Portway's Patent. As most of our readers are aware, these stoves are not new, but testimony on all hands is in their favour, and we believe as a close stove for slow combustion they are not at present to be surpassed.

Mr. George Sinclair, Albion Boiler Works, Leith, sends his Patent Mechanical Stoker; and Messrs. Walker, Turnbull, & Co., Port Downie Iron Works, Falkirk, have a useful exhibit of Register Grates of various qualities, the better ones being fitted with ashes drawer, kerb and tile hearth *en suite*; they also show some very good close fire ranges, and a self-setting range termed the 'Artisan,' fitted with self-acting oven and boiler complete.

Gas-engines applied to several domestic purposes are exhibited by the well-known firms of Crossley Brothers, Limited, Manchester, and J. E. H. Andrew & Co., Southport; Mr. Maurice Gandy, of Liverpool, contributing specimens of his patent cotton machine bitting, while Mr. Syer, of Finsbury Street, London, E.C., sends a small collection of his excellent wood-working machinery tools, &c.

Washing and laundry machinery both for power and hand use is well represented on the stand of Messrs. Thos. Bradford & Co., Manchester and London, a prominent feature being the patent 'Vowel, Diaphragm' steam-power washing and wringing machine, with the patented automatic reversing motion, for public institutions, &c., described and illustrated in the August number of the SANITARY RECORD.

Washing and mangling machines for domestic use are also shown by the Acme Machine Company, 231 Argyle Street, Glasgow, and by Thomas Taylor & Co., Stockport, Glasgow, &c., who exhibit Heap's patent steam-washer, a small apparatus made of tin or copper, with a rotary action, in which steam is generated by the aid of gas jets, and which performs its work in a very satisfactory manner.

The Aluminium Crown Metal Company, Limited, of Birmingham, Glasgow, and London, show a large collection of articles made from Webster's aluminium metal, a new mixture, into the composition of which, besides the aluminium, nickel, no doubt, extensively enters. The principal features for which excellence is claimed are tensile strength, resistance to compression, transverse strength, or rigidity, malleability, conductivity, expansive power, resistance to atmospheric influences, and to acids and ammonia, and its non-galvanic action. It is made of two classes, white and yellow; the former being adapted for domestic articles, sanitary fittings, harness mounts, &c., the yellow entering into competition with gun-metal and similar mixtures for bearings, ship guns, fittings, &c. For cooking utensils as well as for decorative articles in the place of silver or electro-plate it appears to be admirably adapted, its moderate price enabling it to be used for the former, imparting at the same time quite a new and distinctive feature to culinary utensils, while its unusual whiteness and the ease with which it can be kept bright, are amongst its most attractive qualities. There appears to be scarcely a limit to the purposes to which it may be profitably applied.

Mr. Alexander Dick, 110 Cannon Street, E.C., the patentee and manufacturer of what bids fair to cause quite a revolution in the metal trades—viz., 'Delta metal'—has sent a very varied collection of specimens of the material. Those who are unacquainted with this alloy may be informed that it is an improved brass, but as much superior to this metal in every respect as steel is to iron, and, besides being applicable for every purpose for which brass has hitherto been used, its nature is such that many articles that have always been supposed could only be satisfactorily made from steel may with advantage be manufactured from Delta metal. The articles shown at this stand comprise anything and everything metallic, from surgical appliances to propelling screws for a P. & O. Company's steamer, and

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ades telegraph instruments, railway and tramway ngs, engineers', builders', and plumbers' fittings, while its and castings in the rough as well as thick cold-vn rods and forgings render the display complete. ongst its many important features its comparative unity from oxidation when exposed to the atmo-ere or other deleterious influences claims the special ntion of sanitarians.

Messrs. Chorlton & Dugdale, of Manchester, the ers of the patent Excelsior spring mattress, to which ave had occasion to revert at many other times, make rge display of these admirable and sanitary appliances. pted alike for domestic purposes, or invalid or hospital they form the most comfortable, and, we may add, most luxurious couch, and the principle can be utilised any description of bed or reclining chair. Although have illustrated them on several occasions for the efit of those unacquainted with them, we append an

tration of one of the ordinary mattresses for beds. A nt adaptation of the invention has been applied to s' berths, and they are here shown in two varieties, consisting of a double tier one above the other. one set is of inexpensive form, the framework or tead being of iron. The other set is of a more nsive character, and adapted to state rooms of steamers. Three sides of the walls are shown h have been painted in 'Charlton white,' a non-onous paint by Messrs. Orr & Co., of the Silicate t Company, panelled and picked out with gold, mattresses being framed in polished pine. The newest re introduced by the firm is an easy chair with adjust-back also illustrated. A brass rod on the right

side of the sitter, with an endless screw at its lower working on a cogged wheel of gun metal, enables the r to alter the position of the back without rising from eat to any inclination he desires ; as a reading or ing chair it is simply perfection. The firm also bit a new hospital bedstead, the invention of a Mr. es, of Bristol, in which their Excelsior mattress forms basis of the bed. This is designed to enable a patient erform the functions of nature without assistance and out danger of soiling the bed, and at the same time to a flush of water into the container. The invention, h has been well thought out by the patentee, cannot properly described without the aid of diagrams h at the moment are not ready, but an illustrated ription of it will shortly be laid before our readers. s been in use for some months in the British Infirmary, e it has secured the good opinion of the professional engaged, and the nurse under whose care it has been d says that she could attend to six patients lying on beds, with as little trouble as to one on those ally used, a valuable testimony to its worth.

An important invention is shown by Messrs. Gardner & Son, Jamaica Street, Glasgow, comprising a variety of specimens of timber preserved by a patent process of their own from decay, the treatment to which the wood is subject also rendering it non-ignitible. A large wire cylinder, with a lighted paraffin lamp resting on the bottom, is shown, loosely filled with shavings to the top, which appear to have a charmed existence. They are in the same condition at night as in the morning, and constitute one of the most remarkable things to be seen in the exhibition, as they certainly seem to defy the ordinary effects of flame. It is stated that some very extraordinary experiments in connection with the non-inflammable features of wood so prepared have been made, amongst others by Messrs. Elder & Co., the eminent shipbuilders of Glasgow, which would almost lead to the belief that science has attained a complete mastery over the destructive element. Many other advantages are obtained by Messrs. Gardner's processes, comprising great saving of time in seasoning, increased resistance against crushing, reduction of swelling from moisture, as well as in shrinkage, security against sea worms and white ants, and power of arresting ordinary decay. When exposed to damp or moisture, wood has a strong tendency to throw off carbonic acid gas from its sap, which commences to germinate, so to speak, under such conditions; but when prepared by the Gardner process it has been found perfectly impervious to these influences. Another feature in the exhibit of this firm is a collection of parqueterie, which they are enabled to produce at a remarkably low price, and have also introduced it in a novel form for the sides of rooms, being laid in strips on strong canvas, similar to the small dish and plate mats now in use, being thus enabled to be rolled up as an ordinary carpet. This firm also exhibit a very excellent spring mattress remarkable for its extreme lowness in price, and its portable features, illustrated below. The springs used are those of the couch

or easy chair type, one row each at top and bottom being sufficient for producing the necessary elasticity, and on these are ranged parallel rows of nicely rounded and varnished laths, the only necessary addition being a wool or hair mattress. The results gained appear to be quite as effective and comfortable as in the most costly mattresses, and the firm are making them mounted with leather buffers instead of springs, at a price that enables them to enter into competition with the common straw palliasse. To illustrate the difficulties that sometimes beset inventors who are really endeavouring to promote a public benefit, it may be mentioned that, owing to the lowness of price of these appliances (which should have been their strongest claim to public favour), the so-called 'trade,' on whom the manufacturer has generally to depend for the introduction or circulation of his goods, have in many instances passed it over with indifference, because, the price being so low, the margin of profit was rendered correspondingly small.

An assortment of very thin veneers attached to paper, plaster, &c., are shown by Messrs. Eglin and Gilchrist, 70 York Street, Glasgow, and offer an effective and inexpensive mode of covering walls, ceilings, &c., with veritable wood, which, though not thicker than paper, is capable of being polished and varnished the same as the thicker material.

Messrs. Billington, Bros., 18 Upper Duke Street, Liverpool, show their 'Liverpool' spring mattresses. As these were described and illustrated in the last number of the SANITARY RECORD, it need only be

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noted that they are suitable alike for private use, for invalids, and for hospitals, and charitable institutions generally.

Vernon's Patent China and Glass Co., 42 Holborn Viaduct, E.C., show what they term Patent Noiseless Ware. India-rubber rings are let into the bottoms of toilet ware, breakfast, and dinner services. The advantages claimed are less liability of breakage and greater freedom from slipping about a table. The latter feature doubtless renders this manufacture desirable for ships' use.

Messrs. H. W. Cooper & Co., Upper George Street, Edgware Road, have a nice collection of their plate glass ventilators for windows, and also of the louvre ventilators for the same uses. Mr. Cooper was the original inventor of the glass ventilator, which he introduced of the circular form, and which have been so extensively adopted throughout the country. He exhibits here for the first time an oblong ventilator of the same character, which of course slides to and fro, enabling the amount of air admitted to be regulated to the greatest nicety. They are adapted for the larger sized windows, and slide with the greatest ease, running upon hard metal rollers, with ivory knobs to move them. They can be made to any size and to suit any description of window. The louvre ventilators are also exhibited in a variety of forms. The firm have been successful in securing an award for the new oblong ventilator.

Mr. P. A. Maignen, Great Tower Street, London, is also present with the 'Filtre Rapide' which has gained an amount of popularity hitherto unaccorded to these necessary appliances. Although we have on former occasions given due prominence to the invention, attention cannot be too often drawn to a subject that so vitally affects the health of the community. Though differing from all

SECTIONAL VIEW OF MAIGNEN'S 'FILTRE RAPIDE.'—A, reservoir unfiltered water; B, the filter case, which is removable; D, conical sac of asbestos cloth tied over the filtering frame, which consists of a funnel-shape perforated piece with outlet, and aërating pipe. On the outside of the asbestos cloth a charge of powdered 'carbo-calcis' is deposited, by being mixed with the first water run into the filter. This forms a layer on the cloth through which all subsequent water must pass and be purified. E, screen for protecting the filtering medium. F, reservoir for filtered water.

other filters in its arrangements, it is as simple as the simplest, easy to manage, and under the perfect control of the user, while its deodorising and purifying powers are probably in excess of any other in existence. Mr. Maignen has for some time held the medal of the Sanitary Institute for this filter, and as the society do not grant a second medal for the same article, to show the appreciation in which they still hold the invention, they have on the present occasion granted him a 'starred' certificate, which intimates that he is already a medallist, and at the National Health Society's Exhibition, held at Humphreys' Hall, Knightsbridge, in June last, the judges, composed of two eminent physicians and one of the first analytical chemists of the Metropolis, granted it a silver medal, the highest and only award given to a filter, although several others of leading makers were shown. We give a sectional illustration of the 'Filtre Rapide' as made for ordinary domestic uses.

The advances recently made in the development of asbestos, more particularly in the fact that it is now woven into a cloth, has placed a material at Mr. Maignen's disposal, which is immeasurably superior to any kind of textile fabric for his purpose, and has no doubt aided him materially in his success, while the principle he adopts of aërating the filtered water by the admission to it of air (the aërating tube may have a small ball of cotton wool placed on its top to prevent any minute germs from entering), imparts to it an amount of freshness unknown in other filters. The media employed—Carbo-Calcis, a patented combination of the inventor's—besides purifying, has a tendency to soften the water, a great boon for persons liable to gout or calculous disorders. Beyond domestic filters, Mr. Maignen has introduced several ingenious appliances for travellers, emigrants, and for troops on march or in the field. Some of these have been supplied to the Government, and there is good reason to believe they will be generally adopted. Mr. Maignen is now prepared to arrange for the filtration of the entire water supply of towns, &c., which, by his system, can be effected with apparatus of a far less costly character than that now employed, and at a cost that appears quite insignificant. This is fully set out in a pamphlet he has just published, which is worth the attention of all public bodies.

The following remarkable tests have been made with this filter within the last few days under the supervision of a competent authority.

First.—A bottle of claret containing 18°·5 proof spirit (by specific gravity) after filtration through a No. 1 D, Bijou 'Filtre Rapide,' was perfectly colourless, and was found to contain only 4°·7 proof spirit (by specific gravity.)

Second.—A gallon of water containing—

960 grains of urine,
384 ,, ,, sulphate of iron,
384 ,, ,, acetate of lead,

was passed through a Cottage No. 1 'Filtre Rapide,' which had been in use with very bad water for six weeks, and after filtration, tested by Nessler's formula, produced the following results:—

Ferrocyanide of potassium....none
Sulphuret of ammonia .....none.
Cloride of barium.....slight traces of sulphate.
Oxalate of ammonia .....none.
Nitrate of silver and Chromate of potassium } ... traces of chlorine and of ammonia.

Third.—A solution of one gallon of water, and—

60 grains of sulphate of iron,
60 ,, ,, acetate of lead,
30 ,, ,, urine

was passed through a new 'Filtre Rapide,' Bijou 1 D, and by same test, and after filtration gave the following results:—

Ferrocyanide of potassium .....none.
Sulphuret of ammonia .....none.
Chloride of barium .....slightly turbid.
Oxalate of ammonia .....none.
Nitrate of silver and Chromate of potassium } .....none.

An extensive assortment of filters are shown by Mr. Frederic Grosvenor, Eagle Pottery, Boden Street, Glasgow, a local manufacturer of repute. They consist of pocket filters, independent household filters, and self-cleansing cistern filters. They are made in loose parts enabling

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them to be thoroughly cleansed, the medium employed being a compound carbon block, the invention of the exhibitor, which is so arranged that it can be taken out by the user and replaced by a new one whenever necessity requires it. A series of tests made with this filter-block by Mr. John Clark, the City Analyst of Glasgow, places it in a high position, both as regards its deodorising and purifying power. The results are published in a tabulated form, and taking the Grosvenor block at 100, it is placed at from four to five times superior to any of the others tested in deodorising power, and considerably greater in its purifying effects. This table also shows that a great discrepancy exists in the other blocks tested between their deodorising and purifying qualities, the former in all cases being very greatly below the latter. Mr. Grosvenor exhibits in addition a collection of rotary stone-ware butter churns of his own introduction. They are strongly clamped on the outside with galvanised iron, and mounted on strong wood frames. The advantages of stoneware over wood or metal for this purpose must be apparent to every one, on account of its capabilility of being easily cleansed, and the judges have signified their approval of the application by granting a certificate of merit to the inventor.

Disinfectants are exhibited by several of the leading manufacturers. Messrs. Calvert & Co., Bradford, Manchester, are present with their various preparations of carbolic acid, to which we need not further advert, they having been before the profession and public for so many years.

The Sanitas Company, Limited, Bethnal Green, London, have a stand of their different specialities with which our readers must be generally familiar, and which have received the commendation they so justly merit on many occasions. At this season of the year it is perhaps well to draw particular attention to the Sanitas oil, and the handy little vaporiser, by means of which its valuable properties in the form of vapour can be distributed over an apartment. Sanitas has been found of no small value in the treatment of diphtheria, respecting which full particulars are given in the pamphlets distributed by the company. One of the most recent introductions of the firm is Sanitas soap powder, adapted alike for the laundry and all other cleansing purposes. We believe it will be found superior to other extracts of soap as containing less causticity, enabling linen to be washed and disinfected without being destroyed. Jeyes' Sanitary Compound Company, Limited, of London and Glasgow, are also present, with the numerous preparations to which their popular disinfectant has been applied. Besides the disinfecting fluid and disinfecting powder, which has secured so large a share of public patronage, their soaps are remarkably good. No one need wish for a better toilet soap, which, in addition to its disinfecting features, is pleasant to use, and by no means objectionable in odour. A common preparation for ordinary household purposes is also manufactured, and may be said to be as economical as common yellow, independent of its sanitary properties, and the same may be said of the soft soap, which should be more extensively used for domestic purposes. Jeyes' Sanitary Company appear to be quite alive to the requirements of the present time in their particular industry.

Mr. Eugene Rimmell, Strand, London, exhibits his aromatic ozoniser, a fragrant powder of pine and eucalyptus, producing a disinfectant of pleasing scent ; also his ozonised Eau-de-Cologne, and other perfumes and soaps.

Mr. James Wheeler, of Ilfracombe, sends samples of his newly-invented disinfectant 'Pixene,' both in fluid and soap, a preparation we alluded to in connection with our report of the National Health Society's Exhibition in the SANITARY RECORD of June 15.

An exhibit that should excite interest is that of the Condensed Milk Company of Ireland, Lansdowne, Limerick. Now that condensed milk has become so important and yearly increasing an article of consumption, it is gratifying to find that the industry has been established in Ireland, which offers perhaps as good opportunities for producing the commodity as the Swiss cantons, on which we have hitherto mainly relied for condensed milk. We have not yet had an opportunity of analysing a specimen of the milk, but it appears equal in flavour to that of Swiss manufacture, and it is affirmed that a smaller quantity than usual of cane sugar is employed in the process of preparation. With the well-known richness of much of the Irish soil, and the milk-giving qualities of Irish cows, and the fact that an immense area of uncultivated land in Ireland is suitable for pasturage and dairy purposes, as noted by Mr. Ernest Hart in his article 'Forty Years in the Desert,' published in the *Fortnightly Review* for September; the Milk Condensing Company of Ireland may reasonably expect success in their undertaking.

Surgical appliances and instruments are represented solely by local firms—W. B. Hilliard & Sons, 65 Renfield Street ; W. Cowan, 51 Stanhope Street ; and J. Dick, 45 Renfield Street, Glasgow. The former have samples of a variety of hospital fittings, including antiseptic sprays, fever thermometers, croup kettles, ambulance fittings, wound boxes, felt jackets, splints, &c., as well as models of operating tables, and have been awarded a medal and certificate of merit. Mr. Cowan's collection is confined to a case containing an assortment of bandages, abdominal belts, children's and adult's vaccination shields, &c. ; while Mr. Dick sends a very good assortment of instruments, including veterinary and dental, and comprising amputating cases, sets of catheters, rupture-trusses, belts, bandages, elastic goods, a selection of first-rate magneto-electric machines, and a variety of miscellaneous articles.

Messrs. N. Wentworth & Co., Museum Street, London, have a stand devoted to their garments for saving life from drowning, which we also described in the SANITARY RECORD for June 15. The garments, designed both for men and women, may be worn at any time when on the water without inconvenience, and they have been put to severe tests at Glasgow at the public baths under the scrutiny of the judges, with the most satisfactory results.

Messrs. Drummond & Lindsay, 89 Abercromby Street, Glasgow and Edinburgh, have just introduced a system of glazing quite different from any other at present before the public, and possessing important features. Pressure of space and mishap on the part of the firm with the block to illustrate the system, prevents our detailing its merits on this occasion, but we hope to do so in our next number.

The new antiseptic 'Pyridine,' introduced by Messrs. H. E. Overbeck & Co., Duke Street, Liverpool, will also receive further notice on another occasion.

Messrs. J. & W. Kirkwood, Victoria Grounds, Leith, show a polished and well finished zinc bath, with shower-ring and curtain. It is of excellent workmanship and recommends itself to those who prefer this metal to iron or porcelain.

Several of the Glasgow ironmongers have embraced the opportunity to make extensive displays, for the most part consisting of general hardware goods, but as they do not appear to require detailed remarks, and we have already devoted considerable space to the exhibition, the collections may be characterised as very creditable, and the stand of Mr. Osbert Henderson is very attractive.

AWARDS.

The judges of this exhibition—Professor W. H. Corfield, M.A., M.D., chairman; Professor F. de Chaumont, M.D., F.R.S. ; Dr. Bartlett, F.C.S. ; W. Eassie, C.E., F.L.S., F.G.S. ; Rogers Field, B.A. ; J. Wallace Peggs, M.Inst.C.E. ; Ernest Turner, F.R.I.B.A. ; H. Saxon Snell, F.R.I.B.A., and Mr. Henry Law, M.Inst.C.E.—have made the following awards :—

MEDALS.

CLASS I.

ALEX. DICK, London, for delta metal.

ALUMINIUM CROWN METAL COMPANY, for articles manufactured from that metal.

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W. B. MORRISON, Glasgow, for Wedgworth tiles.
SCOTTISH ASBESTOS COMPANY, for their paints and other protectives.

CLASS II.

R. HEAP, Manchester, for dry earth or ashes closets.
J. STEWART, sen., Glasgow, for his exhibit of disconnecting traps.
W. P. BUCHAN, for his exhibit of sanitary appliances.

CLASS III.

ANDREW SHAW & SON, for 'Sine quâ non' cooking range.
J. KEITH, London, for challenge hot water boiler.
WALKER, TURNBULL, & Co., Falkirk, for the artisan cooking range.
WHYTE & BRADFORD, Bo'ness, for cooking range, with revolving fire for the prevention of smoke.

CLASS IV.

MESSRS. F. & C. HANCOCK, Dudley, for their exhibit of machines for domestic use.

CLASS V.

Messrs. W. B. HILLIARD & SON, for their exhibit of hospital and sick-room appliances.
MEYER & Co., New York, for the 'Sanitary Engineer of New York.'
F. WENTWORTH & Co., London, for life-saving garments.

CERTIFICATES OF MERIT.

CLASS I.

DOULTON & Co., London, for silicon tread for steps.
WALTON & Co., London, for Lincrusta-Walton.
GARDNER & Co., Glasgow, for paraquet flooring.
PENNYCOOK PATENT GLAZING AND ENGINEERING COMPANY, Glasgow, for glazing.
MAURICE GANDY, Liverpool, for cotton machine belting, with steel fastener.
BRADFORD & Co., Salford, for washing machines.

CLASS II.

DOULTON & Co., Lambeth, for flush-out closets.
DOULTON & Co., Lambeth, for Lamberton trough closet, with automatic flush tank.
E. & A. E. Gilbert, Broughty Ferry, for improved seat for water-closets.
W. B. MORRISON, Glasgow, for national water-closets.
W. ROSS, Glasgow, for improved paragon valve.
BRITISH SANITARY COMPANY, for improved self-acting earth-closets.
W. P. BUCHAN, Glasgow, for disconnecting drain-trap.
W. P. BUCHAN, Glasgow, for grease trap for kitchen sinks.
J. & W. CRAIG, Kilmarnock, for exhibit of stoneware disconnecting traps.
SHANKS & Co., Glasgow, for Eureka spray and plunge baths.
SHANKS & Co., Glasgow, for cast-iron bath.
SHANKS & Co., Glasgow, for porcelain lavatories with movable caps.
DOULTON & Co., London, for anti-percussion high-pressure valves.
A. T. ANGELL, London, for air-tight man-hole covers.
JAMES BINNIE, Gartcosh, for exhibit of salt glazed fire-clay sewer pipes.
T. H. HARRISON, Liverpool, for iron basket sewage strainer.
C. G. ROBERTS, Hazelmere, Surrey, for automatic rain water separator.
J. STEWART, senr., Glasgow, for disconnecting chamber for house drains with open stoneware channels.
JOHN STEWART, senr., Glasgow, for stoneware pipes with Stanford's joints.

CLASS III.

DOULTON & Co., London, for ventilating tile stove.
HYDES & WINGFULL, Sheffield, for tortoise slow combustion stoves.
HYDES & WINGFULL, Sheffield, for tortoise laundry stove.
CARRON COMPANY, for combined close fire and gas cooking stove.
OSBERT HENDERSON, for pendulous food warmers.
W. M'GEOCH & Co., Glasgow, for Dow's close and open fire cooking range.
WALKER, TURNBULL, & Co., Falkirk, for the simplex cooking range.
WILSON ENGINEERING COMPANY, London, for the Wilson cooking range.
BROWN & Co., Glasgow, for their 'Stott' gas governors.
O. HENDERSON, for albo-carbon light.
H. W. COOPER & Co., for glass revolving and sliding ventilators.
G. E. ELLISON, Leeds, for conical ventilators.
G. E. ELLISON, Leeds, for 'radiator' ventilators.
HILL & HEY, for their double-current ventilators.
C. KITE & Co., for noiseless breast ventilators.
C. KITE & Co., for wall inlet ventilators.
W. & B. LEGGOTT, Bradford, for openers for fanlight.

CLASS IV.

CHORLTON & DUGDALE, Manchester, for spring mattresses.
CHORLTON & DUGDALE, Manchester, for 'Excelsior' ship's berth.
JEYES' SANITARY Co., London, for disinfecting fluid.
CALVERT & Co., Manchester, for carbolic acid and preparations from it.

CLASS V.

HILLIARD & SONS, Glasgow, for an isolating curtain.
HILLIARD & SONS, Glasgow, for burn and wound boxes.
SMITH, ELDER & Co., for sanitary publications.
DURAND-CLAVE, for his exhibit of drawings and books relating to the disposal of sewage in Paris.
GARDNER & SON, Glasgow, for spring mattresses.
BILLINGTON BROS., Liverpool, for spring mattresses.
E. K. GROVES, Bristol, for self-acting sick bed.
VERNON'S CHINA & GLASS Co., London, for their noiseless ware.
F. GROSVENOR, Glasgow, for stoneware churns.
P. A. MAIGNEN, London, for the 'Filtre Rapide.'

The judges have selected the following exhibits for further practical trial:—

CLASS I.—*Construction and Machinery.*—Albissima Paint Company, London—Paints and driers; Griffiths, Berdoe, & Co., Liverpool—Paints and driers; J. B. Orr & Co., Charlton, London—Paints and driers; W. Woollams & Co., London—Pigments and paper hangings; Borough Leather Warehouse Company, London—Crocodile hide leather; Gardner & Son, Glasgow—Preserved timber; Andrew & Co., Stockport—Bischop's gas-engine; Crossley Bros., Manchester—Otto silent gas-engine; Hildesheim—Dick's extincteur.

CLASS II.—*Sewerage and Water Supply.*—Doulton & Co., Lambeth, London—Flush-down urinal; Shanks & Co., Glasgow—Waste preventing cistern; H. P. Boulnois, Portsmouth—Acme sewer pipes; T. Harnett Harrison, Liverpool—Improved collar joint; Doulton & Co., Lambeth, London—Burning brass to lead; A. T. Angell, London—Lip siphon trap; D. Emptage, Margate—Round pipe traps.

CLASS III.—*Heating, Cooking, Lighting, and Ventilation.*—Adams Gas-Heating and Stove Company, Glasgow—Gas-heating stove; J. L. Bacon & Co., London—Hot-water apparatus; J. Carrick, Glasgow—Ventilating open fire-grate; Osbert Henderson, Glasgow—Gas stoves; H. Shaw & Son, Glasgow—Verity's asbestos gas fire; G. Sinclair, Leith—Mechanical stoker; Adams Gas-Heating and Stove Company, Glasgow—Gas-cooking stove; O. Henderson, Glasgow—Eureka gas-cooking stove; E. Sydney, London—Working-man's gas cooker; Waddell & Main, Glasgow—Universal domestic cooking stove;

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Wright & Co., Birmingham—Eureka gas cooker; R. Miller, Glasgow—Peebles gas governor.

CLASS IV.—*Personal hygiene, foods, filters, and disinfectants.*—Doulton & Co., Lambeth, London—Filters of manganous carbon; F. Grosvenor, Glasgow—Filters; O. Henderson, Glasgow—Silicated carbon filters; P. H. Maignen & Co., London—Anti-calcareous powders; Beveridge & Co., Glasgow—Pickles, sauces, essence of coffee; Condensed Milk Company, Limerick—Condensed milk; Irvine & Co., Gateshead-on-Tyne—Mustard; Indian Tea Company, Glasgow—Indian tea; A. Scott & Co., Glasgow—Oat flour; F. Calvert & Co., Manchester—Sulpho-carbolates; H. E. Overbeck & Co., Liverpool—Pyridine disinfecting powder; Eugene Rimmell, London—Aromatic ozonizer; Saracen Soap Company—Sanitary E. C. C. Stanford, Dalmuir—Seaweed charcoal; J. Wheeler, Ilfracombe—Pixene.

NEW INVENTIONS.

THE MANUFACTURE OF WHITE LEAD.

It is to be hoped and may be reasonably expected that the injurious plan hitherto employed in the manufacture of this extensively used pigment will ere long be supplanted by simpler, more expeditious, and more healthful means; nay, even now it may be fairly said that the insidious old Dutch process, which carries disease and death to those employed in its manufacture, is tottering to its base. Before adverting to the new system, which there is good reason to believe will be perfectly innocuous to those employed in it, will reduce the number of hands now necessary to a mere minimum, and altogether dispense with female labour, it will not be out of place to glance at the mode of manufacture as at present carried out, its effect upon the health of the *employés*, and the consequent expense entailed upon various parishes where the industry is carried on, caused by the necessity of providing hospital accommodation and medical attendance for a large number of those employed, whose health is so undermined by this deadly employment that they frequently become paupers in their districts for the rest of their lives. It is not probably going beyond the region of fact to say that the manufacture of white lead, as at present carried on, is more injurious to the health of those employed in it than that of any known industry in this country. The mode generally employed and known as the 'stack' system, briefly described, consists in first ladling the molten metal, previously melted in a cauldron, and then 'running' it into perforated sheets in shallow moulds. These sheets are packed on to 'bogies,' and are run along to the building where the 'stack' is to be erected. The pile is carefully built up in a somewhat lofty building. A layer of tanner's bark is first laid down, and upon this is ranged rows of small pots filled with acetic acid. Over these are ranged the sheets of lead, layer after layer succeeding until the building is nearly filled. The result attained by this process is a chemical combination which causes small lumps of a white pigment to appear on the surface of the sheets. After lying in this state for about three months the stack is carefully taken to pieces, when the sheets are found to be thickly encrusted with the white substance known as white lead; this is broken off the plates, but, being very hard, has to be ground fine under edge runners or stones by a wet process, and allowed to subside in tanks; it is afterwards collected from the tanks into which it has been precipitated. The remaining unchanged portion of the lead is taken again to the melting pots, re-melted, and the process above described again goes on. The wet lead pigment from the tanks is collected by women and is placed in thick ware dishes, which are carried by them into a lofty but narrow stove chamber, where they are left for three weeks for the purpose of thoroughly drying. So far these operations, it is to be observed, except that of the wet grinding, which is the least injurious, are performed by female labour, but the worst is yet in store for the women. After the drying process is complete, the operation of 'drawing the stoves'—that is to say, the removal of the pigment from the drying chambers commences. The dishes before mentioned are handed down from the lofty shelves by women standing on narrow plank scaffoldings to others below, and thence to the packing barrels, this work being continuous until the stack is exhausted. From this spot to the receiving barrels is generally but a very short distance, and the dishes are carried by the women pressed against the breast, and the contents of the dishes are deposited as gently as possible in the barrels. It must be obvious to the most superficial thinker that such a system carried on constantly, and on what may be termed an extensive scale, must necessarily involve the production of a large amount of dust, which the workers cannot fail to breathe, and which is even more fatal to them than the results of the wet material, which, being absorbed in handling it, causes colic, palsy, &c. Three of the operations are admittedly attended with special danger—viz., the handling of the white lead as it is taken from the plates after they are unstacked, the collection of the moist pigment, and the setting and drawing of the stoves, which are all performed by women! It must be evident that in such an occupation the atmosphere must be continually impregnated with dust, which is not only being taken into the system by the workers with every breath they draw, but is absorbed by the face and hands, and clings to the clothing, the result being that colic, palsy, and eventual death overtake many through the poisonous effects of this absorption of lead into the system. Some constitutions are more susceptible than others to the influence of the poison, but it is said that in the most favourable cases the question involved is one of resistance only, not of immunity. It may naturally be asked, are no safeguards provided or possible to secure these poor workers from such direful effects, and it may also be a matter of astonishment how human beings can be found to court a slow death by choosing such an employment. The last question may be answered by instancing that inexorable law of necessity which compels numbers of women to seek any employment to be obtained, and this as near to their homes as possible, many of them being married and having home cares and duties. Such precautions as the nature of the work admits of are supposed to be taken by the workers—such as wearing respirators to cover the nose and mouth, and clothing either over their own or to take its place partially; these are provided by the firms by whom they are employed, and stringent regulations as to washing and bathing are in most cases laid down; but it is said by the women that the respirators impede their free breathing while carrying the heavy pans of lead before described, and, further, that they constantly require to clear their mouths by ejecting saliva; so that we fear the respirators are too often neglected. The clothing usually provided consists of a covering for the head, and a long calico overall to protect the body down to the feet, to keep the dust from touching the skin or alighting on the ordinary clothes of the workers, and so becoming a source of further danger. Gloves also are supplied to be worn on the hands, and the water for drinking has sulphuric acid added to it. The regulations to insure cleanliness consist in ordering the *employés* to take a bath (provided in the works) at stated times, and always to wash the hands and face before taking food and when leaving off work. For washing the hands nail brushes are provided. Certain medicines are also prescribed and generally supplied by the employers, and a medical man is in most factories engaged to attend to the workers gratuitously. All these precautions only go to show how deadly is the employment of white lead making. It will be seen by the above statement that the carrying out of regulations take up a great deal of time, and that they are considered irksome by many of the women. It appears that a number of

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casual workers are often employed who object to the 'everlasting bathing,' to use their own expression. Many of these cumbersome regulations are no doubt disregarded. It is said as a rule that the men, whose occupation is not so injurious as that of the women, and who take more care of themselves than do the weaker sex, are not so open to the evil effects of lead working. To such an extent has illness occurred amongst white lead workers that many parishes have from time to time made representations to the Home Secretary upon the number of cases admitted to their workhouse infirmaries, which have involved a serious charge upon the ratepayers, in many instances the recipients becoming paupers upon the parish rates for life. These representations have resulted in a report being ordered to be made by Mr. Alexander Redgrave, C.B., the Inspector of Factories, which has been presented to both Houses of Parliament, and recently published. In this report Mr. Redgrave says:—'The careful inquiry I have made has shown me that the temporary illnesses and permanent disabilities which affect those working in white lead far exceed anything that has come before the public.' He afterwards adds:—'Occasionally a sudden death occurs, an inquest is held, and public opinion, attention, and sympathy are roused, but the excitement soon passes away, and but little permanent effect has resulted from publicity.' It is impossible in the limits of this article to give Mr. Redgrave's report *in extenso*, but after stating that he has visited every white lead works in the kingdom save two or three, he enters into the question, 'as to how far it would be feasible to lay down in an Act of Parliament regulations which ought to be observed in all white lead works, and the non-compliance with which should disqualify a factory from carrying on the trade of the white lead manufacture;' another clear admission as to the dangers and difficulties of the situation. He goes on to show that manufacturers with whom he has conversed are ready to accept compulsory regulations, if they were impartially enforced in all white lead works; then follow a series of suggestions, thirteen in number, all relating to cleanliness or sanitary precautions and the general comfort of the workpeople, but Mr. Redgrave admits, 'that no amount of precaution can *avert* lead-poisoning under the old stack system. All that can be hoped for is the mitigation of the evil.'

In a parliamentary paper published in 1882 there is cited the examination of seven witnesses, four by the Infirmary Visiting Committee of Guardians of St. Leonard's, Shoreditch, and three by Dr. McLearn, Medical Superintendent of Holborn Union Workhouse; all these white lead workers' testimony in the main goes to show that the clothing provided is of little use, as the lead dust is always present when changing the clothing, between the times of taking it off and putting it on again, and that the arrangements for bathing, washing, &c., where a large number of hands are employed are such a labour in themselves, that it is doubtful if they could ever be carried out to a satisfactory extent. These facts could be supplemented with a great many more did space admit, but enough have been instanced to show the futility of these arrangements and of any such precautions while the deadly poison-dust pervades the air, in preventing the deadly effects of lead-poisoning in persons employed in the manufacture of white lead under the old process.

It now only remains to review a new mode of making the substance which has recently been patented and introduced by Professor Gardner, of 44 Berners Street, late of the Scientific Department of the Royal Polytechnic Institution, Regent Street, W. Professor Gardner has established a manufactory in James Street, Lower Deptford, and fitted it up with an efficient plant, at considerable expense, where with the assistance of but a small number of hands, all men, he is making white lead of the finest quality, his chief agent being electricity. We have said that under the old system three or four months are required to produce the pigment, but this must not be taken literally. It is possible, we believe, to deposit it in five weeks, but commercially or economically speaking it would not 'pay' to pull down a stack in so short a time, as the small quantity produced would increase its price to too great an extent. By Prof. Gardner's system, a fair quantity of lead is deposited in five days! But taking the economic aspect into consideration, he prefers to take a fortnight as his maximum time, when he is enabled to secure as much as would require from three to four months under the ordinary process, without its attendant dangers, and weight for weight with a far less number of hands, without employing female labour, and at far less cost of production. It is satisfactory to be enabled to state, that with one exception, where something akin to malice appears to have operated, manufacturers who have become acquainted with Mr. Gardner's process are making overtures to him for its use to manufacture white lead under royalty. The new process is substantially as follows. After melting, the molten metal is run into small moulds about 14 inches square, and when taken from these it appears in the form of open square lattice work. These blocks are bent over a mandril, and then assume the appearance of small contracted open arches, occupying small room, and which stand upright without assistance. Many experiments were made by Mr. Gardner with a view to find out the best size and weight of metal of which to form these arches from economic consideration before those now used were decided upon, and which weigh 8 lbs. each; they are then placed on wooden trays covered with a layer of pure sheet tin, and are carried to the depositing houses by men wearing India-rubber gloves as a precaution, though up to this point the manufacture appears perfectly innocuous. Before tin was selected, which forms the negative of the system in the battery arrangement adopted, many experiments had to be made with a view to arrive at the most suitable substance. Graphite was used, but was considered too expensive; a carbon block of peculiar character, made by Mr. Gardner himself, for a time was employed, but this did not satisfy him. Platinum or silver would have answered his purpose; but the cost of them in a commercial sense was prohibitive, and eventually the tin was decided upon. Although this metal is nearly akin to lead, in electromotor power, its conductivity is far greater than graphite (which would have been adopted but for its cost). Tin is 187 times more conductive than graphite. The depositing houses are built of brick, and are 12 feet square, with a glass roof, and covered over the bottom with sheet tin. These contain skeleton shelves on which the trays of lead arches are laid. They are heated by steam pipes which pass underneath the floors; running across the chambers internally and a few inches from the bottom is a length of stoneware pipes, perforated with small holes on the under side, called the distributors. Each house when filled holds from eight to ten tons of lead, and these can be increased in number *ad libitum*, according to the size of the factory. Before putting the trays of lead in the houses, they are dipped by machinery in a tank containing an acidulated mixture of acetic acid and some kind of lead to give them a chemically clean surface. The generators, to produce the gases that excite the electric current, are placed outside and between the rows of houses, and are in connection with the distributors. Presuming the houses are filled and ready for work, they are heated up to 120° by the steam pipes. The gases, composed of an admixture of acetic acid and atmospheric air, are then introduced through the stoneware pipes into the interior at a similar temperature, and, striking on the tin-covered bottom, are distributed upwards and permeate through the whole of the contents, and the electric action commences. At the end of the second day the lead is coated with a beautiful white surface. On the third day carbonic acid gas is added, and introduced by the same means, the depositing of white lead being thereby accelerated. This treatment goes on for two weeks, when the gases are withdrawn, the houses allowed to cool, and they are then opened and the contents withdrawn. The shelves are carefully taken out, and the contents placed in a horizontal cylinder

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or cage composed of round iron bars with openings between each, called the agitator, for separating the crust from the lead. It may be remarked that the white lead deposited by this process is soft, and easily crumbles in the fingers; whereas in the old system, as we have before observed, it is so hard that it requires to be chipped off and afterwards ground and crushed by heavy stones and machinery. After being rotated for two minutes in this cylinder, which, by the by, is entirely covered in to prevent dust arising, the white lead falls into a pit underneath, leaving the cores or remains of the lead that has not been converted in the cylinder, from whence they are collected, and in due course remelted, for after conversion. A short distance from the pit is placed the paint grinding-mill and mixer, for it is always necessary to pass the ingredients for making paint through a mill, however fine they may be. Attached to this mill, and communicating with the pit, is an inclined endless band, on which are fixed a number of small buckets, and these fill themselves with the lead from the pit as they pass round, and as they turn over at the top empty their contents into the grinding mill, where, after passing through the rollers the lead falls through the bottom into the mixer beneath, where the oil is introduced, and after a thorough churning passes into another receptacle in the form of best white paint. It will be readily understood from this description how simple and rapid are the processes from the time the operation is commenced with the metallic lead until it is turned out as paint; the whole work is continuous, and the various receptacles are all enclosed, to prevent the dissemination of dust; so that the visitor, were he not previously aware of the fact, would scarcely believe that the preparation of white lead was being carried on. Contrasted with the old system, it certainly appears that Professor Gardner has completely revolutionised the manufacture of white lead. Not only has he rendered it a comparatively innocuous industry, but he has made it a much simpler process, and reduced the time hitherto required for its production in an extraordinary manner, and so facilitated its rapid make and at a much lessened cost of production. But these great advantages of the process sink into insignificance when compared with its hygienic working in rescuing hundreds of poor creatures from lingering illness, not taking into account the attendant expense of their treatment and support, which falls on various local authorities. These corporate bodies, who, as a rule, are large purchasers of paint and other white lead compounds, have on all accounts therefore, a direct interest in patronising the new invention which carries on the successful manufacture of white lead without risk to those engaged in it.

DISINFECTANTS.

No department of medicine or sanitary science has made more progress during the last decade than the manufacture and scientific use of disinfectants, and that these articles are specially appreciated by the public is proved by the large number of manufactories which have sprung up within the last few years simply for the preparation of disinfecting materials. During the recent cholera scare an enormous quantity of these products have been used to purify and sweeten houses, drains, &c., and we know of one or two instances where the local authorities have been sufficiently alive to the importance of thorough disinfection in preventing the outbreak of zymotic diseases to supply disinfectants to the householders for the purpose of sprinkling over the dust and refuse in the house-bins, and to further make elaborate arrangements for the removal daily of the refuse material from each house in the district. The streets have in some cases been swept daily, the sweepings disinfected, and the roads watered with a dilute solution of one of the well-known disinfectants. This will serve to show the rapid progress of sanitary science, and the more public attention is directed to this particular branch of hygiene, the greater becomes the probability of our being able to successfully cope with the various forms of infectious disease which have unfortunately in too many instances made severe inroads on the population of our large towns and cities. The progress of this branch of science is also further shown by the host of new disinfectants which have come into use and the fact that the manufacture of some of the old deodorisers has been vastly improved.

In addition to the disinfectants pure and simple which are in many cases more fitted for the use of the surgeon or chemist than the householder, we have domestic and toilet preparations of every kind, coarse for kitchen use and fine for the toilet; soap, tooth-powder, and perfumes, but all prepared so as to combine use and pleasure—valuable disinfecting properties and comfort combined.

Disinfectants for factories may still replace one bad smell by another as offensive though less injurious, but for household use the ruling principle of the year 1883 is sweetness, purity, and cleanliness. Unless these conditions are fulfilled, the public will hesitate about using them. The reason lies in two causes: every householder has a natural objection to a bad smell, whether proceeding from the need of a disinfectant or from the disinfectant itself. There is also a conceivable tendency running through all classes which amounts almost to a positive objection to let a casual visitor know that any such articles are being used. Such knowledge conjures up visions of scarlet fever, diphtheria, and all sorts of alarms, and the scare raised is sometimes not easily quieted; despite all assurances unpleasant suspicions hold their ground.

Advertising has familiarised the public with many of the present useful preparations, but some really good articles have not been brought forward quite so prominently as some of inferior quality, and generally the public are not able to distinguish the good from the bad.

We purpose making a short report of tests we have made on most of these toilet and domestic articles and to consider the question of disinfectants generally.

Tar and its allied substances form the basis of nearly all modern disinfectants; the most notable exceptions are Condy's fluid (permanganate of potash), Burnett's fluid (chloride of zinc), and chloralum (chloride of aluminum).

When wood is heated in retorts a number of substances such as turpentine, tar, pitch, &c., distil over and charcoal is left behind in the retort. Singularly enough, each of these four substances is of value as a crude disinfectant, and also for the manufacture of the purer articles. Wood-charcoal is but little known to the public as a domestic disinfectant, probably because it has not been brought forward prominently, but it is really of great value. A small quantity, broken into lumps as large as small nuts and sprinkled over meat, fish, or game, will preserve it sweet for days longer during the summer, or a little finely powdered charcoal sprinkled inside game which is too high will speedily bring it into an eatable condition; and as a dentifrice it is excellent, if care is taken to thoroughly remove it with a clean brush.

Our concern, however, is more with the other products of the distillation. Crude turpentine, which consists of spirits of turpentine, oil of turpentine, and resin, is used in the manufacture of Sanitas, Sanitas oil, terebene, and various other preparations. It is, indeed, possible that the old-fashioned plan of polishing staircase treads, furniture, and the margins of bedroom floors, with turpentine and bees' wax is productive of some amount of disinfecting properties; at all events, since the discovery of the production of peroxide of hydrogen and camphoric acid by the action of air on turpentine, it is not too much to suppose that small proportions of these bodies giving a valuable and pleasant aromatic odour are formed, and disseminated into the atmosphere, more especially as this good old-fashioned plan was carried out at least once a week. We should think that it was infinitely superior, so far as disinfection is concerned, to the bulk of the cream and polish that is sold for furniture at the present time.

Tar, the product from the destructive distillation of wood or coal, in a crude and manufactured state, is the basis of

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several disinfectants; carbolic and cresylic acids are its two most active constituents, and it is probably owing to the presence of these two most valuable ingredients that tar soaps, coal tar soaps, Jeyes' perfect purifier and the Pixene preparations have attained their deservedly popular characters.

The Terebene household soap is excellent and cheap; the Terebene toilet soap is a capital article; we have used it for some time 'turn and turn' with two or three other soaps, and it is certainly quite equal to anything in the market; the tooth-powder is a soapy one, and although dentists speak very highly of the value of soap for the teeth, yet many persons have a particular aversion to it. To such we say don't use it, but to those who have not this prejudice it is a valuable resource for cleansing the teeth and gums.

We can also speak well of the Terebene jelly; it is a compound of terebene and glycerine. Its effects are healing, and it has the valuable property of decreasing the inflammatory action of chaps and abrasions of the skin. There are many cases in which the use of Terebene cream for the hair would be needful and valuable.

Sanitas is the invention of Mr. Kingzett. It is manufactured from turpentine (of which only certain kinds are suitable), by agitating it with water and air. The Sanitas Company are the manufacturers. Their list of preparations is rather extensive, comprising three sorts of fluid—oil, three kinds of powder, and five kinds of soap, and an emulsion—all with the word 'Sanitas' prefixed.

Generally speaking, all these preparations are good, although, of course, some are to be greatly preferred to others. Sanitas oil, when used for closets and foul drains, or when consumed in a vaporiser, either the special one sold by the Sanitas Company, or any common form—such as one of Rimmel's scent vaporisers—is a valuable antiseptic and deodoriser, and it has the advantage of being comparatively cheap; but as it is not well suited for the toilet table or nursery, we must choose some other preparation. Sanitas Fluid, No. 2, is well suited for these purposes; so also is Sanitas Toilet Soap. Of the latter especially we can speak very highly, but the Old Brown Windsor does not please us so well, and it is evident that the mixture of Sanitas with this class of soap is not so successful.

Toilet Sanitas is a delicately flavoured preparation, high in price, and which in character may be considered as a disinfectant aromatic vinegar. The last preparation of the Sanitas Company which we shall mention is the Sanitas disinfecting powder, which is an excellent article for every day use.

Pixene is another preparation of the light oils of tar; the inventor is Mr. Wheeler. So far, we have only met this substance in two forms—pixene, and pixene soap. Pixene is a strong aromatic liquid, mixing readily with water to form a lotion, gargle, or injection; the proportion required is small, and the antiseptic and disinfectant properties are high. Pixene soap is a favourite with persons to whose notice we have brought it. At the time of washing its odour is far more marked than Sanitas soap, but does not remain on the hands. A trial of this soap is certainly to be recommended.

Coal tar soap has been well and favourably known for years. Its name is a very familiar one, but hardly the one that should have been chosen, because many of the constituents of coal tar are removed before the manufacture is commenced. Carbolic and cresylic acids are the most active principles present. It partakes rather more of the character of a medicinal soap than those we have referred to before. Its special use in cases of skin disease is well known, and usually it proves a successful remedy.

Calvert's carbolic acid is another old, well-known, and efficient disinfectant, but some of the preparations are so powerful that they require rather more care in using than the other preparations already described. Calvert's carbolic toilet soaps are very satisfactory, and much used by the public. This firm are putting up carbolic acid in the very handy form of what are called 'safety tablets.' These little things, supplied in boxes of a dozen, are handy to dissolve in water, and each one makes a definite dose of disinfectant of known strength, one tablet being sufficient for a quart of solution. This is the best and safest form for carbolic acid when used for household purposes.

Jeyes' Perfect Purifier and Jeyes' Sanitary Powder are compound preparations consisting to a very great extent of some of the coal-tar products. The Perfect Purifier is a liquid which requires to be diluted for use with about 100 times its volume of water. We have made many experiments with it, and undoubtedly found it a satisfactory article, and its action on accumulations of decomposing animal matter is very sharp and effectual. The Sanitary Powder is easily applied, and does not involve the trouble of dilution.

Messrs. P. & P. W. Squire, of Oxford Street, have not been behindhand in the preparation of various toilet disinfectants. This firm first introduced and registered, at the suggestion of Mr. Ernest Hart, a very pleasant and pleasing toilet article known as thymol soap. This preparation has since been copied with more or less success by several manufacturers, but so far we certainly prefer the original preparation of Messrs. Squire, which has the property of being economical, in that it is lasting, and therefore not like some other forms of disinfecting soaps, which, on account of their solubility in water, are exceedingly wasteful. This, we presume, arises in a great measure from carelessness in the mode of manufacture. Thymol soap, however, does not suffer from these objections: it is a strong antiseptic, and as such is equal to any other article of its kind at present in the market. We understand that its virtues have been sufficiently appreciated to cause it to be regularly used in Queen Charlotte's Lying-in Hospital. It is also more particularly valuable to the surgeon and in the dissecting-room of our hospitals for use after operations; it is here that its antiseptic properties, combined with pleasant aroma, are most important. Eucalyptol soap, another preparation of the above firm, is also an exceedingly pleasant and valuable soap. The antiseptic ingredient is derived from the eucalyptol oil obtained by distillation of the blue gum-tree wood of Australia. The antiseptic properties of this tree are well appreciated in our Australian colonies; and as all the essential properties are contained in the oil, it is not surprising that this class of soap has already attained a degree of popularity which we consider well deserved.

All these preparations have been used largely at the London hospitals, a fact which speaks strongly in their favour.

With all these preparations available there is no earthly reason why drains, closets, and all accumulations incidental to the residence of a number of people in a limited area should not be daily disinfected, while streets and gutters should be kept clean by the local authority, and either watered with a dilute solution of disinfecting material or the powder sprinkled along the gutters and roadside. On the doctrine that prevention is better than cure, this would go a great way towards preventing the spread of disease, and in diminishing the severity of its more infectious forms. Much has doubtless been done of late years towards the development of sanitary science. Even now, however, we know too well the effect of faulty joints, and we are still to a very great extent dependent upon the good workmanship of the plumber in order that our houses may be rendered safe against the invasion of various forms of sewer gases. Even then, despite said good workmanship, we are not entirely safe, as breakages and leakages frequently occur in soil-pipes and house drains; and this probably goes on for some considerable time before attention is drawn to the matter. This being the case, it is certainly well to institute a systematic use of some of the well-known disinfectants in order to counteract some of the serious evils which are continually arising from the escape of noxious and poisonous emanations, carrying along with them the germs of disease. This occurs both in our streets and at times, from accidents

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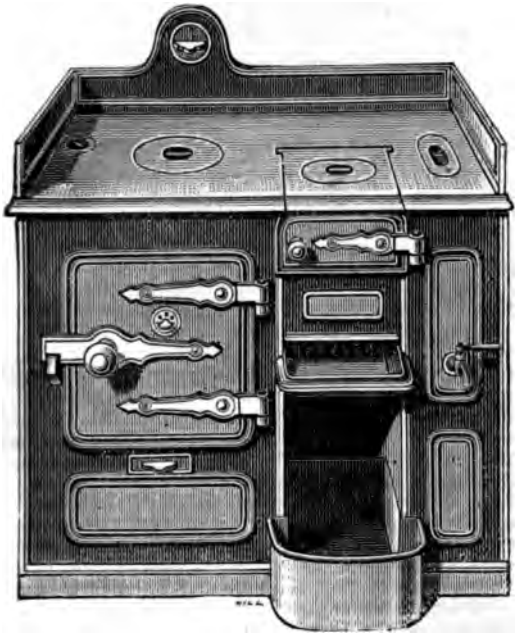
such as we have described, in our houses. More especially do these arguments apply to the smaller streets and alleys of our large towns. Something more should certainly be done to see that they are properly cleaned and disinfected, as it is here that the germs of disease are evolved, to increase and multiply under favourable conditions, and to disseminate themselves—unless killed and checked by disinfecting materials—among the wealthier and more opulent parts of our cities.

BROWN & GREEN'S PATENT SMOKE-CONSUMING COTTAGE KITCHENER.

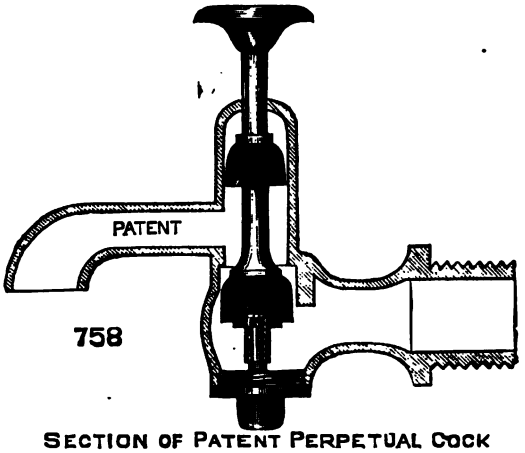
It will be recollected that at the late Smoke Abatement Exhibition the gold medal (the only one given to domestic appliances) was awarded to Messrs. Brown & Green, of Finsbury Pavement, and Luton, Beds, for their Underfed Open Grate and Kitchener. The kitchener then exhibited was of rather a large size, when there were not wanting critics who urged that the mode of feeding thus employed could not be made effective in a small-sized kitchener, such as would be required in the houses of working men or small families, and it was also reasonably urged that until smoke-consuming grates could be introduced, suitable to the masses in price as well as effectiveness, the question would remain a 'class' one. Messrs. Brown & Green, who, since the close of the exhibition, have been actively employed in developing their invention, have succeeded in rendering the principle as much to be relied on in a small as in a large apparatus, and are now prepared to supply them in the smallest sizes in which kitcheners are made, viz., from 2 feet long upwards, suitable for the smallest cottage. Our illustration represents one



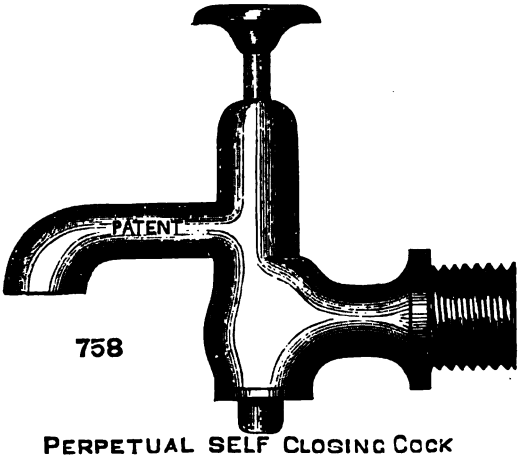
feet 6 inches long, comprising oven and boiler (the 2 feet size can only be made with an oven), in which the underfeeding arrangement is as perfect as in the larger sizes. The small trough in which the fresh fuel is placed will be observed at the bottom of the bars in front, from whence it is pushed forward by means of a hoe-shaped raker underneath the burning coals. The shape of the fire basket is rounded, and rises slightly from front to back, which renders the action of pushing the fresh coal forward an easy matter, and as the covers on the top of the range would have to be removed to feed the fire at that spot, the insertion of the fuel from the bottom is the easier of the two. As it has been clearly demonstrated that bottom feeding is the surest means of preventing smoke, and further, that the Brown & Green kitchener is the most simple and effective on this principle hitherto invented; an apparatus suitable for the smallest class of houses is now available, which, if generally adopted, would considerably clear the atmosphere of London or any other large town.

A NEW WATER TAP.

There are few articles connected with domestic matters on which more attention has been bestowed than on the humble appliance on which we are dependent for holding back or delivering water. Simple as a water tap may appear to the uninitiated, water companies are most particular in not giving their consent to any being used that has not been approved of by them. The dangers to which the public are subjected from ordinary water taps are twofold, the most serious being that, through carelessness or inadvertence, they may be left running, when the annoyance and expense is oftentimes great; the other objection being leakage, and the violent concussions that occur when they are turned off straining pipes and producing an objectionable noise often heard in the private apartments of the household. The tap under notice has been introduced by Messrs. John Russell & Co., the eminent tube makers and brassfounders of Queen Victoria Street, E.C., and they have succeeded in producing an article, which they have named 'The perpetual self-closing tap,' that appears to answer all requirements. The illustrations show the tap in section and elevation.



SECTION OF PATENT PERPETUAL COCK



PERPETUAL SELF CLOSING COCK

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It will be seen that it is of the most simple and reliable character. On reference to the section, it will be observed that it contains two cup leathers, or washers, with a globular chamber at the bottom of the tap, which is of the push-down type. If there is no water in the pipes, the spindle holding the washers falls to the lowest point, and the tap is really open; but immediately the pipes are filled the pressure of water causes the spindle to rise, and the cup leathers rest on the shoulders shown, and so close the outlet. When water is required to be drawn off, the top, or 'push,' is pressed down, opening the water way, and allowing the flow, but immediately the 'push' is released, it rises and hermetically closes the orifice, and arrests the supply. We may be told that a push-down tap is no novelty, but all push-down taps have hitherto been accompanied by springs, at all times objectionable, and never to be used where they can be avoided, and the spring push-downs are always subject to the concussion before alluded to. We have seen these taps in action with a thirty-pound pressure of water behind them without the slightest concussion being apparent, and so long as the cup leathers are in order no leakage can occur. Should any be observable, it may be assumed that a new leather is required, and this can be attached by any person by merely unscrewing the nut at the bottom and putting on a new one. It is quite evident that no more simple arrangement can be devised for a tap, and the price at which they are offered is even less than the more complicated apparatus, not to be relied on, which are now in use.

THE 'STRAWFENA' CIGARETTE.

UNDER the title of the 'Strawfena' a new cigarette has been introduced by Messrs. Robinson & Barnsdale, cigar manufacturers, of Nottingham, which places this now universal mode of smoking tobacco in quite a new category, and one that only requires to be known to be generally appreciated. The idea suggested itself to the makers in consequence of the objections that have been urged in certain quarters against smoking tobacco in the form of the ordinary cigarette, which, as our readers must be aware, is said to cause the smoker to absorb more nicotine than in any other way. The new invention, of which we give an illustration in a reduced size, is ingeniously made up, and great credit is due to the inventors for the manner in which they have worked it out. The cigarette, which is of full size, has attached to its end a small disc of finely-perforated pipe-clay, the whole being bound round with paper in a slightly spiral form, ending in a mouth-piece of straw, cool and pleasant to the mouth as amber. No nicotine whatever enters the mouth, and the cigarette is smoked out to the last bit, making the smoking of the 'Strawfena' more economical than that of the ordinary kinds, and also preventing the small particles of tobacco entering the mouth. Having tested these cigarettes thoroughly, we can give our testimony to their worth. Notwithstanding the extra cost that must be entailed in their manufacture, from the delicate manipulation required, the proprietors offer them to the trade at a price that will enable tobacconists to retail them at the same price as those of the ordinary make, and should any difficulty be experienced in obtaining the Strawfena the makers will supply them direct. A fresh and clean mouthpiece with every cigarette is a desideratum not to be despised by the habitual smoker.

THE LANCASHIRE OPEN FIRE GRATE.

THOSE who were present at the Manchester Smoke Abatement Exhibition last year, which was opened shortly after the parent exhibition, held at South Kensington, was closed, or who have read the volume published by Smith, Elder, & Co., the 'Official Report of the Smoke Abatement Committee,' could scarcely have failed to notice a grate, the invention of Mr. Jaffray, of that city. Although exhibited in a somewhat crude form, it came out, as a smokeless grate, remarkably well in the tests, but owing to the inventor not being connected with the line of manufactures to which it appertained, some delay was caused in its general introduction. Since then the inventor has disposed of his patent rights to Messrs. Morrison, Ingram, & Co., sanitary engineers of Tonman Street, Manchester. It may be noted that Mr. Ingram was the inventor of the Kaio-kapnos grate, which he disposed of to Messrs. Clark, Bunnett & Co., of London, and exhibited by them at South Kensington, where it secured a silver medal—the highest award given in its class. Since the acquisition of the Lancashire grate by the firm in question, they, in conjunction with the patentee, have made considerable alterations in the grate, both in its efficiency as a smoke consumer and its adaptability to suit both the tastes and pockets of the general public.

The illustration shows the front of an ordinary register grate, which can readily be applied to the back portion of grate, which really forms the patent.

The grate is now offered to the public as a smokeless, slow-combustion, and 'bright glow' grate for burning bituminous fuel; and it is remarkable for the rapid changes that can be effected from the one to the other of these applications. It has three actions,

which may be described as follows. At first lighting, the ordinary valve or 'register,' which is hung in a different manner to that of other grates, is opened, and a direct communication with the chimney is effected. This, however, is only necessary for a short time, when it may be closed, and either of the other two, on which the grate depends for its most important features, are brought into action (fig. 1.) If a slow-combustion fire be required, a second valve, called the quick-combustion valve, and actuated by a knob in front, is also closed. The products of combustion are then collected at the top of the grate under the 'register,' and drawn down side-flues at the back of the fire-clay sides or cheeks, into a combustion chamber situate beneath the fire-clay bottom (fig. 2). This illustration will give the reader a fair indication of the working of these flues and smoke currents. To this chamber is admitted a copious supply of atmospheric air from the front, which, quickly becoming heated, mixes with the gases, and so insures combustion, by burning what little smoke has reached it, the residue being carried underneath again to the lowest portion of the grate and up the back to the chimney. For a bright-glow or quick-combustion fire, the valve before mentioned is opened; this allows the products after passing through the peculiarly constructed fire-basket, which will

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ently be described, to pass out at the bottom part of back by a narrow horizontal slit or opening, when r are also conveyed to the combustion chamber, and s away to the chimney by the same route as when the r-combustion principle is being worked. The whole of interior of the grate is composed of fire-clay, the back lecting forwards, and the basket for holding the s is small. This promotes economy, as but comparaly a small quantity of fuel can be used at one :, yet the heat given off and the bright appear- : of the fire are remarkable. The fire-clay fits are mostly 'loose' or portable; thus, the bottom, lid slab, can be taken in and out at pleasure and

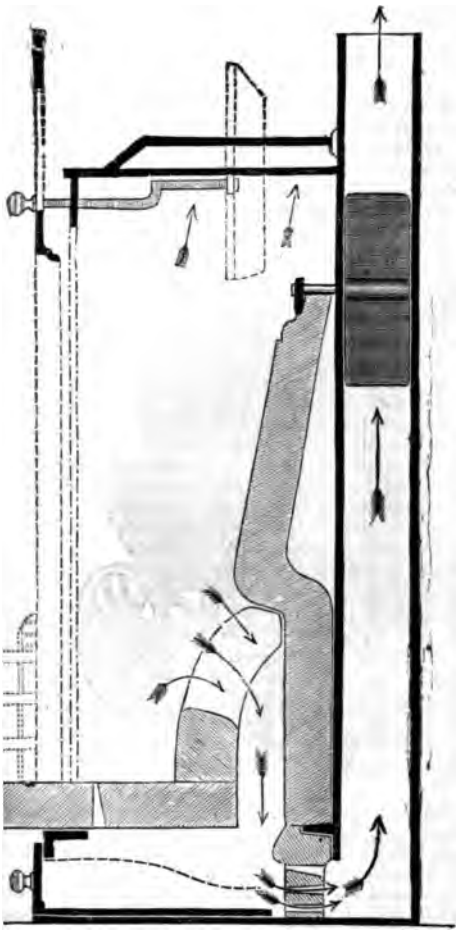

FIG. 1.

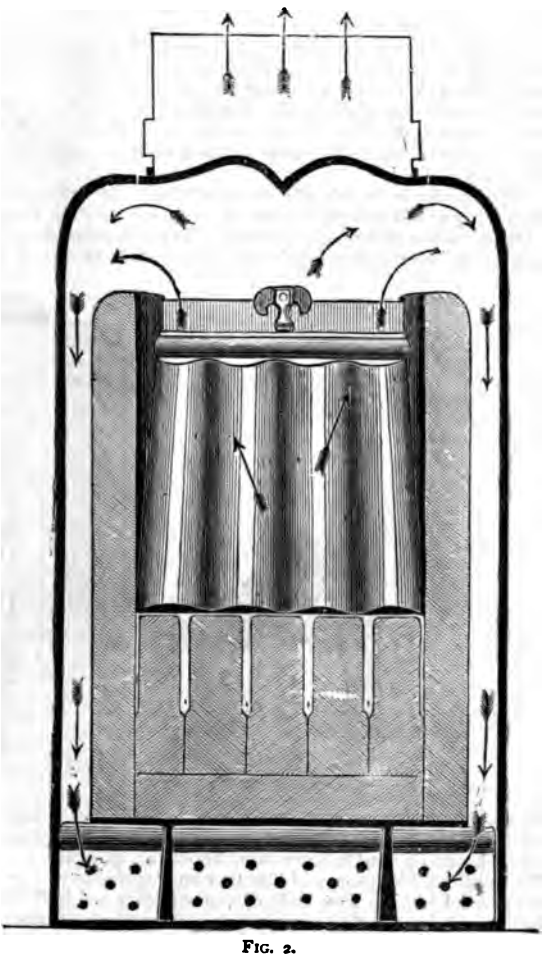

FIG. 2.

ig upon this, and also composed of loose pieces fitting places arranged for them, are lumps of fire-clay of oved shape like small bricks, with a narrow vertical stice between each, forming a kind of first back to the . These lumps only cost about one penny each, and be renewed from time to time as they burn away, a, by-the-by, will not be very often. It will thus be that there is a large mass of fire-clay employed, rs collecting heat, communicating it to the flues and bers at its back and bottom, and giving it off into the ment as this material is known to do. The constant sion of atmospheric air which also permeates all the bers and soon assumes the proportions of super-heated tends materially to consume any unburnt particles rbon, and the result is, broadly speaking, an entirely eless grate. Another improvement introduced by Ingram is an arrangement for the introduction of fresh air from the exterior of the room into a chamber built around the back of the grate, but instead of admitting it into the apartment at once from the upper part of the grate in the manner usually employed, he collects it by means of a shaft or shafts, which may be made of ornamental character, and carried to any portion of the room that fancy may suggest, an excellent means of diffusing heat over a large area, and to this he adds another shaft for carrying off the vitiated air, which is made to pass through the hottest portion of the grate, and so into the flue. We need only add that small as was the smoke shade made by the grate at the Exhibition, that shade has been materially reduced by the aid of the improvements we have mentioned, and that as a non-producer of smoke the 'Lancashire,' whether viewed as a slow-combustion or bright-glow grate is the most effective that we have yet seen, and is another step towards solving the problem how an open fire grate can be rendered smokeless.

NEW AMBULANCE FOR ACCIDENTS.

THE celebrated north country carriage builders, Messrs. Atkinson & Philipson, have forwarded us the accompanying illustration of the new ambulance introduced by them, in the manufacture of which scientific principles as well as ingenious mechanical contrivances are involved.

The ambulance has been constructed to the order of the Newcastle Corporation for use at their fever and small-pox hospitals, and the progress of its manufacture has been carefully watched by Dr. Henry E. Armstrong, the

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medical officer of health for Newcastle-on-Tyne, who by his valuable suggestions has contributed largely to its success. The builders have worked with a twofold purpose in making the carriage serviceable for infectious diseases or for cases of accident at the large iron-works and mines in various parts of the country.

In manufacturing districts it is a common practice to carry injured workmen to the infirmary or hospital in heavy lumbering carts without springs, and it is natural to assume that the sufferings of the men are increased unnecessarily. On the score of humanity, therefore, the introduction must be welcomed of a vehicle that will enable employers of labour to have their injured servants carried to their homes or to the hospital speedily and with a certain degree of comfort.

Regarded from a sanitary point of view the ambulance is a marked improvement on anything that has been introduced up to the present time, as conditions necessary for the prevention of contagion are rigidly observed even in the smallest details. The numerous medical men who have inspected the vehicle have given it their unqualified approval.

The interior is capable of accommodating three patients (two lying at full length and one in a sitting posture) in addition to two nurses or attendants. In front there is a seat for an extra person beside the driver, who has a view of the whole interior by means of a small window at his back. The invalids who are unable to sit upright are carried, one on the Philipson stretcher-couch, designed by Mr. William Philipson, and the other on a canvas stretcher on parallel poles. The body of the stretcher-couch is a galvanised iron spring mattress on a framework of ash, and fitted with wheels having India-rubber tires; the wheels are removable; thus it may be reduced where the width of passage will not admit it at its normal size; the wheels enable it to be run along the floor of a sick ward noiselessly and easily. In this respect it is likely to be of great utility in general hospitals, or in any place where persons are to be carried short distances.

From the sketch it will be observed that the position of this couch in the ambulance is on the floor, which is grooved to admit and hold the wheels in position. Directly over this is a canvas stretcher on parallel poles suspended from the roof on strong hooks covered with India-rubber. These hooks are jointed, and may be folded back to the roof when not in use. On this stretcher patients may be placed in bed without disturbing them by removing the canvas, as the poles are made to slip out of position when the cross-bars are removed. It is also possible, in special cases, to place the bed of the patient on the floor instead of using the stretcher.

In lieu of cloth cushions for patients able to sit, an ingenious contrivance is adopted. This is a frame covered with interlaced wire, which can be set at any inclination to suit the back, and gives all necessary ease.

The attendants are provided with suitable receptacles for medicines and stimulants, and ventilation is supplied in the most liberal manner, but precautions are taken to render draughts impossible. During the daytime light is obtained by the embossed glass windows in the door and sides of the conveyance. At night an unique lamp is used for lighting the interior. It is a special design by Mr. John Philipson, and may be detached and used as a hand lamp on dark stairs, or wherever it may be necessary. The outside lamps are also original, and may be fitted with coloured glasses if necessary. Outwardly, the ambulance is a striking contrast to the carriages generally used, as the builders have made it light and cheerful by varnishing it in the natural colour of the wood, suitably edged, and they have painted the interior in shades of drab, light colours being least liable to retain infection. The appearance cannot fail to produce a favourable impression on the invalid.

The weight of the carriage (which may be worked easily by a single horse), and the facility with which it may be turned in narrow streets are advantages that will be readily recognised.

The hind axle is cranked to admit the body near to the ground, and a broad low step gives easy access at the back. The wheels are high, the springs long and elastic, and the axles are fitted with the patent India-rubber collars, consequently the draught is easy and the motion is smooth, and free from jar and noise, even when it is driven fast over pavement.

By permission of the Newcastle Corporation during the recent training of the Northumberland Hussars, the ambulance was used regularly each day by that corps. Several officers, including Lord Ralph Kerr and Col. the Earl of Ravensworth, had the stretchers and various other appliances tested in a course of ambulance drill under the supervision of Surgeon-Major Heath, of Newcastle. The ambulance drill reflected the fullest credit on Dr. Heath, who is untiring in his efforts to forward the movement. Under his direction the whole worked perfectly, producing a very good impression, and calling forth the opinion that it compared very favourably with the old military ambulance, and was likely to be taken up by the authorities, who would doubtless adopt Dr. Heath's suggestion that, for this purpose, the sides should have folding curtains instead of panels. Small hand-ambulances and other designs are made by the firm.

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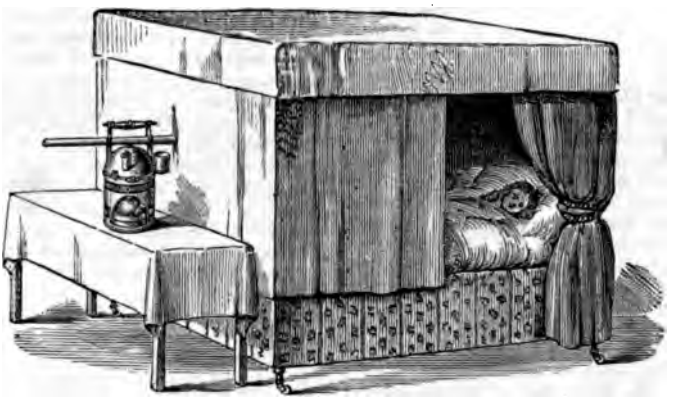
MESSRS. ALLEN & SON'S SICK ROOM APPLIANCES.

In again calling attention to Messrs. Allen & Son's inventions, we are only reminding our readers that under the auspices of many leading members of the medical profession they have from time to time introduced appliances that have been proved to be of great worth in the sick room. On the present occasion we desire to call attention to their ventilating croup, or tracheotomy kettle, first brought to professional notice by Mr. R. W. Parker, in his able paper on 'Tracheotomy in Membraneous Laryngitis.' This kettle, which we illustrate in elevation and in connection with its use in sickness, consists



of a block tin stand, a lamp holding three gills with large burner to generate steam quickly, and a boiler holding five pints of water. A tube attached to the top of the boiler is connected with the cross tube, and a coarse or fine jet is provided to regulate the amount of vapour required. The pressure at which the steam issues out of the jet creates a vacuum behind, and procures a constant supply of warm moist air through the draft tube, either for use in rooms, or inserted in the croup tent erected over the bed, as in our second illustration. There are other features in connection with the kettle regulating its safety, ease of manipulation, &c., to which we must refer our readers to Messrs. Allen & Son's prospectus. We need only call attention in our concluding remarks to the iron frames supplied by the firm for erecting over a cot or bed. These frames have expanding sides, and ends, and thus adapt themselves to any bed. When not in use they can be folded up into a small compass. Messrs. Allen & Son have received very distinguished awards for this appliance wherever they have exhibited it, and it will be found a valuable accessory in the treatment of the various pulmonary and laryngeal complaints for which it is intended.

SANITARY JOTTINGS.

SANITARY.

The continued high death-rate of Newcastle, which for the week ending Sept. 29 reached 33 in the 1,000, is naturally creating considerable uneasiness in that city, and was the subject of discussion at the last monthly meeting of the City Council. The infantile mortality has been much increased by an epidemic of measles, whilst an unusual number of deaths in the infirmary has also helped to swell the average. No blame is attached to the official sanitary staff, which was never more efficient, but the excessive mortality is attributed in no small degree to the contempt which so many thoughtless people display for the ordinary canons of health.

Mr. Redgrave, C.B., H.M. Chief Inspector of Factories, has recently visited the whitelead factories on the Tyne, in view of the application of the new Act, which comes into operation on Jan. 1 next. It is reported that the manufacturers of the district are well prepared to meet the requirements of the new Act.

Dr. Buchanan, the medical officer for Thirsk district, in a recent report gives a lamentable account of the wretched condition of that town as regards sanitary matters. Amongst other defects he draws attention to the number of great filthy ashpits, containing pools of stagnant putridity, so sunk below the ground as not to admit of effectual cleansing.

In the competition for the drainage of Tiverton, the first premium has been awarded by the Town Council to Messrs. Gotto & Beesley, of Westminster.

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PARKS AND OPEN SPACES.

OPENING OF A NEW PARK AT COVENTRY.—A new park, the gift of Mr. David Spencer, has been opened. The donor, in addition to presenting the land, has given a further sum of 4,000 guineas for the laying out and ornamentation of the park.

OPEN SPACES AT BETHNAL GREEN.—The Bethnal Green Vestry, under the presidency of Mr. J. V. Jones, has instructed its Works Committee to confer with the rector of the parish, the Rev. Septimus Hansard, with a view to laying out the extensive churchyard of St. Matthew's parish church as an 'open space' for the use of the people. In pursuance of a letter from Lord Brabazon, calling the attention of the Vestry to the deplorable state of the district churchyard of St. Bartholomew, in the same parish, the Works Committee have been requested to inspect the ground and report thereon. Mr. Thurgood, however, protested against the expenditure of the rates in improving churchyards as being virtually the revival of the old and obnoxious impost of a church rate, to which thousands of Nonconformists in the parish would be opposed.

IN order to encourage tree planting, the last legislature of the State of New York passed a law by which any inhabitant who shall transplant by the side of the public highway adjoining his premises any forest shade trees, fruit trees, ornamental trees, or any nut-bearing trees, shall be allowed in abatement of his highway tax one dollar for every four trees set out. Elms must be placed not less than 70 feet apart on the same side of such highway; and no maples or other forest trees, ornamental or fruit trees, nearer than 40 feet apart on the same side of such highway.

MISS DUTHIE has presented a public park to the City of Aberdeen, and it has been formally opened by the Princess Beatrice. The park—a magnificent tract of wooded land, lying to the south-west of the city, and commanding a panoramic view of lower Deeside—stretches over an area of 44 acres. It is bounded on the south side by the river Dee, and from its higher points a picturesque view of the loftier Deeside mountains can easily be obtained. Lakes, rockeries, ornamental bridges, flower parterres have been formed, and full advantage has been taken of the splendid natural amenities of the tract of country, and the result is a popular recreation ground which for picturesqueness and beauty is considered to be unsurpassed in the kingdom. The survey of the park was entrusted to Mr. M'Kelvie, surveyor, of Dundee, whose design has met with general acceptance as an admirable example of landscape gardening. On the north side is a prominent feature in the shape of a huge artificial grass-covered mound about 30 feet in height, on the top of which is a pedestal of six steps, and about 12 feet high. This pedestal at present supports a flagstaff, but by-and-by there will be placed upon it a colossal bronze memorial of Sir William Wallace, the cost of which will be defrayed by funds left for the purpose by the late Mr. Steel, of Edinburgh. The new park has cost Miss Duthie the sum of fifty thousand pounds.

BY a substantial majority the City Council of Newcastle agreed at their last meeting to authorise their committee to enter into negotiations for the extension of the Elswick Park, by the purchase of the adjoining site, which seemed likely to fall into the hands of speculative builders.

COMPETITIONS.

STATISTICAL SOCIETY.

HOWARD MEDAL.

THE usual annual competition for the Howard Medal (1884) will take place subject to the usual rules and conditions, which may be had from the Assistant Secretary at the office of the society (King's College Entrance), Strand, W.C., London. The Essays to be sent in on or before June 30, 1884. The Council have again decided to grant the sum of 20*l.* to the writer who may gain the Howard Medal in 1884. The subject is, 'The Preservation of Health, as it is affected by Personal Habits, such as Cleanliness, Temperance, &c.,' the candidates to be referred to Howard's account of his own habits, as well as to his opinions, as set forth in the text and footnotes of his two works on 'Prisons' and 'Lazarettos.'

HIGH AWARDS.

MESSRS. ROBERT BOYLE & SON, of 64 Holborn Viaduct and Glasgow, have been adjudged for their Patent Self-Acting Air-Pump Ventilators the First Prize—Silver Medal—by the Mining Institute of Cornwall at their Conference recently held at Redruth. This firm has also been awarded the First Prize Medal at the Cork Exhibition, where their system is used for the ventilation of the Exhibition Buildings.

NEW INFECTIOUS DISEASES HOSPITAL AT NEWCASTLE-ON-TYNE.

THE Sanitary Committee of the Newcastle-on-Tyne Town Council, acting under the advice of Mr. Worthington, of Manchester, their referee, have selected the plans of Mr. A. Gibson, architect, Newcastle, for the proposed new hospital for infectious diseases to be erected at Heaton, near that city.

CONGRESSES.

THE SECTION OF STATE MEDICINE.

INTERNATIONAL MEDICAL CONGRESS, COPENHAGEN, 1884.

THE eighth session of the International Medical Congress will be held in Copenhagen in 1884. The organising committee for the section of State Medicine consists of the president, Dr. E. Hornemann, the secretary, Dr. J. C. Lehmann, and the following gentlemen: Prof. Gædeken, Prof. Warncke, Dr. Ditlevsen, Dr. Engelsted, Dr. Hertel, Dr. Holst, Dr. Schleisner, Dr. Storch, Dr. Trautner, Dr. Tryde, of Denmark, Dr. Bidenkap, of Christiania, Dr. Dahl, Director-General of the Medical Administration in Norway, Dr. Thoresen, of Norway, Dr. Berlin, Director-General of the Medical Administration in Sweden, Prof. Heyman, Prof. Jäderholm and Dr. Linroth of Stockholm.

The following is a provisional list of the questions to be discussed:

1. What can be done to check the abuse of morphine and other preparations of opium? 2. What can be done to prevent the great mortality in early infancy in the large towns and their neighbourhood, especially among nurse-children? 3. How can the abuse of alcohol be best prevented? 4. How can an effective hygienic inspection of schools be procured? 5. On holidays in the country for poor children from the large towns. 6. What are the most effective and the most practical disinfectants at present in use? 7. The mortality of phthisis in proportion to the living populations with respect to its distribution on the various ages and sexes. 8. The influence of cellar-dwellings upon morbidity and mortality. 9. How is scurvy to be prevented in prisons and workhouses? 10. What measures can be proposed by the Legislature to prevent accidents from poison, especially from arsenic and the many various objects which nowadays contain arsenic? 11. What measures can be considered the most effective to prevent an epidemic, when a single case of an epidemic disease has appeared, and what diseases ought to be subjected to such measures? 12. How can an immediate want of hospital-beds in large towns be supplied in the most practical manner? 13. The forensic importance of moral insanity. 14. The application of the spectrum-analysis to forensic questions, especially for the demonstration of poisoning by oxide of carbon.

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NOTICES OF MEETINGS.

CLASS FOR THE STUDY OF HYGIENE.

A NEW class for the science of hygiene, specially intended to prepare students for the examinations of the Government Science and Art Department, of which the syllabus was published in the SANITARY RECORD of Sept. 15, p. 104, will be held on Friday evenings, in connection with the Quebec Literary and Scientific Institution, in the rooms of the Ascham Society, 18 Baker Street, by Dr. Saunders, Certificated Sanitary Science, University of Cambridge. The specimens and diagrams to illustrate the lectures have been lent by Mr. T. Twining, founder of the Twickenham Museum.

CAMBRIDGE SANITARY SCIENCE EXAMINATION.

THE following gentlemen have satisfied the examiners in both parts: A. G. Bartley, M.D.; P. Cowen, M.R.C.S.; W. W. Day, M.D.; F. W. A. East, M.B.; D. W. Finlay, M.D.; C. Glasier, M.B.; W. Gripper, M.B.; J. F. Herring, L.R.C.P.E.; R. B. Hill, M.B.; C. W. Mackury, L.R.C.P.E.; T. F. Pearse, L.R.C.P.; E. Penny, M.B.; M. Read, M.B.; J. Richardson, M.B.; G. J. S. Saunders, M.B.; R. D. R. Sweeting, M.R.C.S.

LIVERPOOL SCIENCE AND ART CLASSES.

SESSION 1883-84.

CLASSES FOR LADIES IN HYGIENE AND ANIMAL PHYSIOLOGY.

DURING this Session a class for the study of hygiene, in accordance with the syllabus issued by the Government Science and Art Department, will be conducted by Miss Helen Fryer, who has been specially registered by the Department as a teacher. Miss Fryer will also continue to conduct a class in Animal Physiology.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

SESSION 1883-84.

THE first meeting of the Session will be held on Friday, Oct. 19, at 7.30 P.M. The president will deliver an inaugural address, entitled: 'The need of Unity in Metropolitan Sanitary Administration.' To commence at eight o'clock. J. Northcote Vinen, M.D., St. John's, Southwark, S.E., and Shirley F. Murphy, 158 Camden Road, N.W., Hon. Secs.

SICK-ROOM NURSING AND FIRST AID TO THE INJURED.

IN connection with the Yorkshire Ladies' Council of Education, a course of Six Lectures on the above subjects will be delivered by Dr. Alice Ker, of Leeds, in the Victoria Hall, Huddersfield, commencing on Friday, Oct. 19, 1883. The lectures will be delivered on consecutive Friday afternoons at half-past three o'clock.

APPOINTMENTS UNDER THE PUBLIC HEALTH ACT.

MEDICAL OFFICERS OF HEALTH.

ALFORD, Henry James, M.D.Univ.Lond., M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Taunton Urban Sanitary District, at £180 per annum for five years.

BALY, Joseph Sugar, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Royal Leamington Spa Urban Sanitary District, at £80 per annum for three years.

COLEMAN, Gerald Edward, L.R.C.P.Edin., and L.M., M.R.C.S. Eng., has been appointed Medical Officer of Health for the Hemsworth Rural Sanitary District, Yorkshire, at £40 per annum for three years, *vice* Wood, resigned.

ECCLES, Edmund, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the newly-formed Longridge Urban Sanitary District, at £10 per annum.

EVANS, William, L.R.C.P.Edin., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the comoined Anglesey and Holyhead Rural, and the Beaumaris and Holyhead Urban, Sanitary Districts, at £125 for one year.

HODGSON, Isaac Clark, M.B., C.M., has been appointed Medical Officer of Health for the Workington Port Sanitary District, *vice* Douglas, resigned.

JACOB, Edward Long, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Guildford Rural Sanitary District, at £150 per annum for 2½ years, *vice* Smith, resigned.

JONES, William Makeig, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Swinton Urban Sanitary District, at £40 per annum, *vice* Blythman, resigned.

MARSHALL, John Ingham Fearby, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the York Rural Sanitary District, at £150 for one year.

NORMAN, John William, L.R.C.P.Edin., F.R.C.S.Edin., has been appointed Medical Officer of Health for the Ross Rural and Urban Sanitary Districts, at £60 and £15 for one year, *vice* Cock, resigned.

NUNN, Philip William Gowlett, L.R.C.P.Lond., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Bournemouth Urban Sanitary district, at 100*l.* for one year.

O'CONNOR, Thomas, F.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the March Urban Sanitary District, at £30 for one year, as from Sept. 1.

PALMER, William Grimes, L.R.C.S.Edin., M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Loughborough Urban Sanitary District, at £60 for one year, ending Sept. 29, 1884.

PARKINSON, Charles Henry Watts, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Wimborne and Cranborne Rural Sanitary District, at £80 for one year, from Sept. 29 last.

PERN, Alfred, L.R.C.P.Lond., F.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the South Stoneham Rural Sanitary District for three years.

SHORTRIDGE, Thomas Wood, L.R.C.P.Edin., L.R.C.S.Edin., and L.M., has been re-appointed Medical Officer of Health for the Honiton Urban Sanitary District, at £20 for one year.

THOMPSON, Abram, M.D.Univ.St.And., M.R.C.S.Eng., L.L.A.Lond., has been appointed Medical Officer of Health for the Ulverston Rural Sanitary District, at £133 per annum, *vice* Page, appointed Medical Officer under the Local Government Board.

WHITGREAVE, Vincent, L.R.C.P.Edin., M.R.C.S.Eng., has been appointed Medical Officer of Health for the Sheffield Urban Sanitary District, at £500 per annum, *vice* Hime, appointed to Bradford.

SURVEYORS, CLERKS TO GUARDIANS, INSPECTORS OF NUISANCES, &C.

BADCOCK, Mr. H. J., Banker, has been appointed Treasurer to the Taunton Guardians and Rural Sanitary Authority, *vice* Mr. Henry Badcock, resigned.

BAYLIS, Mr. Thomas William, has been re-appointed Surveyor and Inspector of Nuisances to the Redditch Local Board and Urban Sanitary Authority, at £165 per annum.

BERINGER, Mr. John Jacob, F.C.S., has been appointed Public Analyst for the Borough of Bodmin.

BIRKBECK, Mr. Henry, jun., Banker, has been appointed Treasurer to the St. Faith's Guardians and Rural Sanitary Authority, Norwich, *vice* Mr. Wm. Birkbeck, resigned.

BOTTOMLEY, Mr. Samuel, has been elected a Member of the Barkisland Local Board and Urban Sanitary Authority, Yorkshire, *vice* Riley, resigned.

BREEZE, Mr. John, has been re-appointed Surveyor and Inspector of Nuisances to the Wellington (Salop) Rural Sanitary Authority, at £140 for one year.

BUDDEN, Mr. Harry, has been re-appointed Surveyor and Inspector of Nuisances to the Corporation and Urban Sanitary Authority of Basingstoke, at £160 for one year.

CHESTERFIELD, Mr. Cooper, has been appointed Surveyor and Inspector of Nuisances to the Hinckley Local Board and Urban Sanitary Authority, *vice* Maltby, resigned through ill-health.

CLARK, Mr. Frederick Dixon, has been appointed Surveyor and Inspector of Nuisances to the Market Harborough Great and Little Bowden Local Board and Urban Sanitary Authority, at 150*l.* per annum, *vice* Mawbey, appointed Surveyor to the Corporation and Urban Sanitary Authority of Kings Lynn.

DALBY, Mr. George B., has been appointed Treasurer to the newly-formed Longridge Local Board and Urban Sanitary Authority.

EMPSALL, Mr. Samuel, has been appointed Clerk, Surveyor, Inspector of Nuisances, and Collector to the Church Local Board and Urban Sanitary Authority, Lancashire, at £125 per annum.

FARMER, Mr. Joseph, has been appointed Collector to the newly-formed Tettenhall Local Board and Urban Sanitary Authority, Staffordshire, at 3½ per cent. commission.

FARMER, Mr. Joseph Henry, has been appointed Town Clerk and Clerk to the Urban Sanitary Authority of Bootle-cum-Linacre, at £500 per annum, *vice* Pierce.

FARR, Mr. J. M., has been appointed Inspector of Nuisances for the Battle Urban Sanitary District, at £100 per annum, *vice* Morris, whose appointment has expired.

FORSYTH, Mr. James, of the Wolverhampton and Staffordshire Bank, has been appointed Treasurer to the newly-formed Tettenhall Local Board and Urban Sanitary Authority.

GATES, Mr. Thomas Frederick, has been appointed Surveyor and Inspector of Nuisances to the Steyning Guardians and Rural Sanitary Authority, Sussex, at £120 for one year.

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GILES, Mr. R., has been appointed Inspector of Nuisances for the East Stonehouse Urban Sanitary District, at £70 4s. for one year, *vice* Roberts, whose appointment has expired.

HARRIS, Mr. Henry, has been appointed Collector to the Brierley Hill Local Board and Urban Sanitary Authority, at £60 per annum, *vice* Williams, deceased.

HOUSTON, Mr. Alexander, has been appointed Clerk to the Ventnor Local Board and Urban Sanitary Authority, at £80 per annum, with offices &c., *vice* Wilson, resigned.

HOWSE, Mr. Henry, has been re-appointed Inspector of Nuisances for the Aylesbury Urban Sanitary district for six months.

JOHNSON, Mr. E. W., has been appointed Treasurer to the Dulverton Guardians and Rural Sanitary Authority, *vice* Ronald, resigned.

JUKES, Mr. James, Solicitor, has been appointed Clerk to the newly-formed Longridge Local Board and Urban Sanitary Authority, at £15 per annum.

KIRBY, Mr. James, has been appointed Surveyor, Inspector of Nuisances, and Collector to the newly-formed Longridge Local Board and Urban Sanitary Authority, at £78 per annum.

LEWIS, Mr. Anthony Crasswell, has been re-appointed Surveyor of Highways, Inspector of Nuisances, and Building Surveyor, to the Havant Local Board and Urban Sanitary Authority, at £75 per annum.

LOFTUS, Mr. Thomas, Solicitor, has been appointed Town Clerk and Clerk to the Urban Sanitary Authority of Blackpool, at £500 per annum, and costs out of pocket for professional business, *vice* May.

MALTBY, Mr. Charles, has been elected a Member of the Ilkeston Local Board and Urban Sanitary Authority, Derbyshire, *vice* Mr. George Maltby, resigned.

MANBY, Mr. A., Solicitor, has been appointed Clerk to the newly-formed Tettenhall Local Board and Urban Sanitary Authority, at £30 per annum.

MANN, Mr. J. T., has been elected a Member of the Bishop-Stortford Local Board and Urban Sanitary Authority, *vice* Tucker, deceased.

MORTIMER, Mr. John, has been re-appointed Inspector of Nuisances for the Elland Urban Sanitary District, Yorkshire, at £25 per annum, for two years, as from July 9 last.

PARKER, Mr. Charles John Bullivant, has been appointed Treasurer to the Grantham Guardians and Rural Sanitary Authority, *vice* Hardy, deceased.

PHILLIPS, Mr. James, has been appointed Collector to the Bournemouth Improvement Commissioners and Urban Sanitary Authority, at 1½ per cent. commission, vice Wyatt, resigned.

POWELL, Mr. Thomas, has been re-appointed Treasurer to the Dawley Local Board and Urban Sanitary Authority, and to the Madeley Local Board and Urban Sanitary Authority, *vice* Wilkinson, resigned.

PRITCHARD, Mr. Edwin, has been elected Chairman of the newly-formed Tettenhall Local Board and Urban Sanitary Authority.

RUSTON, Mr. A. R., has been elected a Member of the East Dereham Local Board and Urban Sanitary Authority, *vice* Stammers, resigned.

SHARMAN, Mr. Alfred, has been elected a Member of the Wellington (Salop) Board of Improvement Commissioners and Urban Sanitary Authority, *vice* Leake, absent from ill-health.

SHRUBB, Mr. J. L., has been elected a Member of the Lymington Local Board and Urban Sanitary Authority, *vice* Perry, deceased.

SIMPSON, Mr. John, jun., has been appointed Surveyor, Inspector of Nuisances, and Collector to the Wirksworth Local Board and Urban Sanitary Authority, Derbyshire, at £100 per annum, *vice* Millington, resigned.

STODDART, Mr. F. W., has been re-appointed Public Analyst for the Borough of Bridgwater and the City of Salisbury for one year.

STRAWBRIDGE, Mr. George Charles, has been re-appointed Inspector of Nuisances for the Taunton Urban Sanitary District at £100 per annum, for five years.

STUDD, Mr. George, has been elected a Member of the East Dereham Local Board and Urban Sanitary Authority, *vice* Armstrong, resigned.

THOMAS, Mr. Charles, has been re-appointed Inspector of Nuisances for the Leominster Rural Sanitary District at £70 per annum, for three years from Christmas next.

TUCK, Mr. Buckmaster Joseph, has been elected Chairman of the newly-formed Seaford and East Blatchington Local Board and Urban Sanitary Authority.

WOODS, Mr. T. R., has been elected Chairman of the Lowestoft Board of Improvement Commissioners and Urban Sanitary Authority.

WRIGHT, Mr. H., has been appointed Collector to the Redditch Local Board and Urban Sanitary Authority, at £40 per annum, *vice* Baylis.

LOCAL INTELLIGENCE.

TETTENHALL LOCAL BOARD AND URBAN SANITARY AUTHORITY.—The first election of members has resulted in the return of Messrs. Daniel Groucutt, William Smith, Thomas George Clear, Thomas Berwick Cope, Edwin Pritchard, William Henry Cadwallader, Thomas Walker, Thomas Joseph Perry, Charles Henry Crane, Henry Wright Owen, Joseph Moseley, and Richard Simpkins.

SEAFORD AND EAST BLATCHINGTON LOCAL BOARD AND URBAN SANITARY AUTHORITY.—The first election of members has resulted in the return of Messrs. Thomas Ade, Joseph Barber, James Cowney, William Henry Cullingford, Theophilus Channing Gittins, Edward Joseph Gorringe, Robert Lambe, Buckmaster Joseph Tuck, and Richard Underwood.

The Ventnor Local Board and Urban Sanitary Authority have passed two resolutions based upon the recommendation of a special committee; 1st, To apply to Parliament for an Act to enable them to acquire land and construct a pier, at a cost not exceeding £20,000; and 2nd, To offer £2,000 for the existing pier.

It is proposed to constitute Wollaston, near Stourbridge, a Local Government district.

The Guildford Rural Sanitary Authority have been invested by the Local Government Board with urban powers under Sections 157 and 158 of the Public Health Act, as regards portions of the parishes of Stoke and Woking.

The Towcester Guardians and Rural Sanitary Authority have been invested with urban sanitary powers as regards the parish of Towcester.

The Tiverton Guardians and Rural Sanitary Authority have increased the salary of Mr. H. T. Bolt, the Inspector of Nuisances, from £40 to £50 per annum.

Mr. G. Pelley, the chairman of the Sandown Local Board and Urban Sanitary Authority was, a few days since, seized with apoplexy as he was entering the office of the Pier Company, of which he was chairman, and expired almost immediately.

Mr. Stancomb, the Lord of the Manor, Trowbridge, having offered to sell the estate known as 'The Limes' for £4,000, or for £3,000 if for a park, the Local Board convened a public meeting to discuss the subject, which resulted in the passing of a resolution in favour of the purchase of the estate by the Local Board.

The Willenhall Local Board and Urban Sanitary Authority have increased the salary of the Inspector of Nuisances from £50 to £60 per annum.

The Amersham Guardians and Rural Sanitary Authority have at length received the sanction of the Local Government Board to the appointment of Mr. William Hosegood as Medical Officer of Health at the reduced salary of £50 per annum until Sept. 29, 1884; but upon the understanding that prior to the expiration of that time the Authority will reconsider the question of salary with a view to an increase of it, should the circumstances render it advisable.

NOTES AND QUERIES.

Having for some time back been in the receipt of Queries appertaining strictly to sanitary work, and which it would be easy to answer without having to refer our correspondent to competent professional advisers, we have opened a column in which to register such Queries and Replies thereto as can fairly be expected from us; and our subscribers and readers are invited to make such use of this column as will tend to benefit themselves and the community. Both Queries and Replies will, however, be subjected, if unnecessarily long, to a strict curtailment.

108. DISCONNECTION OF CESSPOOLS FROM HOUSE DRAINS

B is the owner of a house in which there is a sink-waste connected with a cesspool, the same being a nuisance injurious to health. I have made a request on B to cut off the communication with the cesspool and discharge the same in the open air over a trapped gully. On behalf of B it is contended that the Act is not retrospective, the house having been built some years before the passing of the Act of 1875. Please state whether I am correct in proceeding under Sect. 91, P.H. 1875, there being no by-laws to assist us.

I. N.

[Section 40 of the Public Health Act provides, amongst other things, that every local authority shall provide that *all* cesspools within their district be constructed and kept so as not to be a nuisance or injurious to health. If it be so kept, the provisions as to the repression of nuisances contained in Section 91 and the following sections of the Public Health Act undoubtedly apply.

109. EMPTYING OF PRIVIES.

The borough of —— has the old privy system and excrement removal. A has a privy that is full and foul. He is served with a notice to thoroughly empty the same; he partially empties it, but refuses to further comply with notice. I contend that he must comply with the requisition of the notice. Can A be summoned under Sect. 95 of the Public Health Act of 1875.

I. N.

[We think so. Inasmuch as this is a nuisance which will infallibly recur, would it not be well to endeavour to get a more wholesome system of excrement disposal set up at the house? Section 96 gives power to the magistrates to make an order prohibiting the recurrence of a nuisance, and directing the execution of any works necessary to prevent the recurrence.

A PETITION has been presented to the Town Council of South Shields relative to the obnoxious fumes escaping from the Tyne Alkali Works, which are situated on a low level in a populous locality. Mr. Jackson, the inspector of alkali works for the district, had reported that the percentage of acid escapes was considerably within the limit of the Alkali Act, but, from the situation of the works, the public health was endangered when the exhaust steam was blown off, which, when condensed, affected everything more or less injuriously where it fell.

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ORIGINAL PAPERS.

METROPOLITAN SANITARY ADMINISTRATION.*

By T. ORME DUDFIELD, M.D.

President of the Society.

IN the address which it is at once my duty and my privilege to deliver on this the opening night of another session, I take as my subject Sanitary Administration in the Metropolis, and I propose to deal with it under three heads, viz.:—1. The need of unity in sanitary administration ; 2. How such unity may be brought about ; and 3. The probable benefits of unity being attained.

1. The need of unity in sanitary administration can scarcely admit of question when we reflect that the care of the public health in this greatest of cities is committed to the charge of some forty separate authorities, created, it is true, and deriving many of their powers from one and the same Act of Parliament, yet practically independent each in its own district, having no bond of connection enabling them to combine for the common good, and excepting in special and local cases for special and local objects rarely holding communication one with another.

The metropolis stands alone in this respect, being the only city that, so to say, is *not* at unity in itself. In every other large centre of population we see a single authority deriving its powers from codified laws and dealing with every branch of public health and sanitary administration.

The ill effects of what may be called sanitary disunion in London are not far to seek. As regards questions of public health, affecting the whole community, you are aware that, excepting in the case of an emergency, such as an invasion of cholera, when special legislation is called into operation, there are no means of combining the governing authorities for the common defence. No, not even for so necessary an object as preventing the spread of a loathsome disease like small-pox. An epidemic may break out in one district and prevail for many days without the fact becoming known to the authorities in adjoining districts, and hence no combined measures can be taken for checking and preventing its spread at the onset, when alone a successful result is possible. It may be said, indeed, that, lacking 'compulsory notification,' the authority of the district first invaded may itself remain but too long in ignorance of the outbreak. This, however, only proves the need of unity, for Parliament could not refuse to a strong central sanitary authority whatever powers experience showed to be necessary to enable it to deal with infectious diseases, however unwilling it might be to intrust such powers to numerous and disunited minor sanitary authorities.

A significant illustration of the need of unity is furnished by the history of the hospitals for infectious diseases. Ever since 1866 the sanitary authorities have had power, separately or collectively, to provide hospitals for the sick in their respective districts ; but this power, speaking generally, has not been exercised. And why? It was felt, probably, that the task was too great to be undertaken by each district separately, and there existed no means of compelling adjoining districts to combine for the purpose. In the following year the difficulty was solved in a practical way, but almost, as it were, by accident—viz., by the enactment of a law which, while nominally providing for the needs of paupers only, has actually endowed the metropolis under a single authority with an admirable set of hospitals which have become available, and, with proposed additions, will shortly be adequate for the needs of all classes of the population. The fatal stigma of pauperism until recently nominally attached to these institutions : but here, again, practical common sense overruled strictly legal considerations ; for not only did no actual disqualification result from relief administered in the Asylum Board's hospitals, but, what is more, the use of them has been greatly stimulated by the practically free admittance given to all comers. The experiment thus unconsciously made proved so successful that in the last session a Government measure was introduced and carried, by which the sanction of law has been given to a state of affairs that had grown up contrary to the provisions of law, and such as was never contemplated by the Government which introduced, or the Legislature which enacted, the Metropolitan Poor Act, 1867. And thus it has come to pass that the society may at length be congratulated on the adoption by Parliament of a principle for which it was the first, or among the first, to contend—viz., that 'the assistance afforded to the sick in hospitals for the treatment of infectious diseases ought not to be considered pauper relief.' The correlated proposition that 'the hospital treatment of infectious diseases should be dissevered from any relation with pauperism,' will be adopted sooner or later. Meanwhile the Asylums Board, a poor law authority in theory, admittance to its hospitals being obtainable only through poor law agencies, has become a sanitary authority in practice, and will become a sanitary authority in law should occasion unhappily arise for putting into force certain provisions of the Diseases Prevention (Metropolis) Act, 1883, a measure to which we are indebted for the valuable concession just alluded to.

It is a curious feature in our sanitary legislation that, while the most complete provision has been made for preventing the spread of animal infectious diseases—by notification of illness, by isolation of the sick, and by disinfection rigidly carried out—no such provision has been made against the spread of human infectious diseases. We have no power to enforce notification ; isolation is almost impossible except by voluntary removal to hospitals, whilst disinfection is only efficient—so far as it is efficient—because sanitary officials, with the consent of sanitary authorities, but without legal obligation, have largely taken the matter into their own hands. The success of 'local authorities' in 'stamping out' animal infectious diseases is greater than any we can claim in our incessant warfare against human infectious diseases—partly, no doubt, because they possess the power of slaughtering the sick. Experience, however, justifies the conviction that if the necessary powers of dealing with such diseases were conferred on sanitary authorities, a far larger measure of success than heretofore, and that measure is not inconsiderable, might be attained. There is little reason to anticipate the grant of such powers until a strong central sanitary authority shall have been

* Being the Inaugural Address delivered to the Society of Medical Officers of Health, on Friday, Oct. 19, 1883.

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created by which the action of the several local sanitary authorities may be combined for the common good.

Even under existing legislation a central authority would be able to confer public benefits not to be expected so long as sanitary power remains scattered and divided. In illustration, I would refer to one of the most important wants of the age—healthy dwellings for the poor. The necessity is paramount, but can never in any large degree be met through the operation of Artisans' and Labourers' Dwellings Acts. No! it is to a more humble and more practicable machinery we must look, that, to wit, provided by the 35th section of the Sanitary Act, 1866, which empowers sanitary authorities, with the sanction of the Local Government Board, to make regulations as to 'lodging-houses,' other than common lodging-houses. This subject has on more than one occasion received earnest consideration at the hands of the Society which, not many years ago, prepared a code of 'regulations' for the guidance of sanitary authorities; few of which, however, have applied for the necessary powers; and yet there is evidence that where the provisions of the section have been honestly carried out, excellent results have been attained. Nothing short of the exercise of such powers will suffice to compel owners of tenement houses, and occupiers of lodging-houses, to do their duty by their unfortunate lodgers; and it is beyond hope that the Act will ever be put into operation, in all parts of the metropolis, and efficiently carried out, under uniform by-laws, settling, among other things, the proper amount of cubic space to be allowed, until we have a central sanitary authority superior to all local and interested considerations.

Baths and washhouses, public urinals and water-closets for both sexes, mortuaries and disinfecting chambers, can only be mentioned by name, in passing, as instances of sanitary wants still most inadequately supplied after more than a quarter of a century of divided sanitary government. A central authority affords the only prospect of adequate provision of such institutions, suitably located for general use, irrespective of local boundaries.

An unconscious striving after unity in sanitary administration has occasionally led to something like conflict of jurisdiction, the result of piecemeal legislation. As instances of this I would refer to the Slaughter-houses (Metropolis) Act, 1874, dealing with offensive trades, and to section 34 of the Contagious Diseases (Animals) Act, 1878, dealing with cowsheds, dairies, and milk shops. Under these enactments the Metropolitan Board of Works is the 'local authority' for the metropolis, the city only excepted. No exception could have been taken to the action of the Legislature in conferring this position on the Board, had its duties been limited to the preparation of by-laws and general supervision, and had the duty of inspection been specifically entrusted to the sanitary authorities. Nevertheless, all drawbacks notwithstanding, that considerable benefit has accrued from the legislation in question is indisputable; it is a fruit of unity resulting from practical co-operation between the central Board having apparent jurisdiction but no proper sanitary staff, and the local boards without defined jurisdiction, but possessing an ample staff of sanitary officials. Had the duty of framing by-laws been committed to the vestries, &c., we might have had as many codes as 'local authorities,' despite the labours of the society to promote unity, labours of which the Metropolitan Board made such good use in framing their by-laws under both the Acts.

The exigencies of time forbid further illustrations of the need of unity in metropolitan sanitary administration: I pass on, therefore, to consider the second head of my subject, viz.:

'How such unity may be brought about?'

Two courses are open: the existing sanitary authorities may be swept away, and an entirely new authority created to rule over an undivided London: or, the present local machinery being retained, a central board may be established to take charge of all great matters affecting the metropolis as a whole, to lay down the principles on which sanitary administration should be carried out, by framing by-laws, &c., and, generally, to exercise a supervisory control over the work entrusted by the Local Management Acts to the vestries and district boards: the central board would, so to say, be legislative in its functions, the local boards executive, and thus substantial unity might be attained with a minimum of change.

I have no hesitation in expressing my individual preference for the second of these courses, and I suppose that the manner in which some such a scheme may be brought into practical working is a question that may be expected ere long to engage the attention of the Legislature, it being difficult to believe that a system which has worked so well and conferred so many benefits on the metropolis should be cast aside, in order to give trial to a new, a vast, and a doubtful experiment such as that involved in the adoption of the first course.

Assuming for the occasion that the more conservative course will be adopted in any proposed legislation, let us briefly glance at the constitution, the jurisdiction, and the duties, so far as they affect the subject, of the several bodies out of which the new machinery of local government will be evolved. They are forty (or, if we include the Metropolitan Asylums Board, forty-one) in number—viz., the Corporation, the Metropolitan Board of Works, twenty-three vestries, and fifteen district boards of works.

The Corporation, very ancient and still unreformed, consists of 232 members, of whom twenty-six are aldermen, representing as many wards, and 206 common councillors, representing twenty-five wards. The aldermen are elected for life—some of them by constituencies so insignificant in point of numbers that less than 200 votes have sufficed at a contested election to determine the choice of a future lord mayor. The common councillors are elected yearly. The City over which this large and dignified body has rule comprises an area of about one square mile—actually 668 acres—has a declining resident population of some 50,000, half of what it was 200 years ago, occupying, to a large extent as office caretakers, some 6,500 houses, and has a rateable value exceeding 3,500,000*l.* The sanitary administration is in the hands of a statutory committee of the corporation, the 'Commission of Sewers,' which consists of ninety-five members—viz. lord mayor, recorder, common sergeant, the three representatives of the city at the Metropolitan Board of Works, six aldermen and eighty-three common councillors—and discharges duties similar to those of the vestries, &c. Like the vestries, the Commission retains the services of a medical officer of health and a staff of sanitary inspectors.

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The Metropolitan Board of Works comes next after the Corporation in order of importance, but for an obvious reason I shall first refer to the vestries and district boards. In the constitution of these bodies the limits of parishes—one of the most ancient of our institutions—were respected. Outside the City there are seventy-eight parishes: twenty-three of these are self-governing centres, the governing body being the vestry, while other fifty-five are grouped in numbers varying from two to eight to constitute fifteen district boards. Vestrymen are elected by the ratepayers, members of a board by the constituent vestries of the district. The maximum number of members in these bodies is 120, the total for the metropolis being about 2,500. One-third of the members go out of office annually in rotation, all being elected for a period of three years. The importance of the several parishes and districts estimated by acreage, mileage of streets, population, rateable value, &c., varies considerably. Thus, while St. James's, Westminster, has an area of 162 acres only, Wandsworth contains 11,488. The latter district has over one hundred miles of streets, while in St Martin's-in-the-Fields the streets extend for eight miles only. The rateable value ranges from about 200,000*l.* in St. George's-in-the-East to 1,700,000*l.* in Kensington. The population from 29,000 in St. James's, Westminster, to something like 300,000 in Islington.

The duties of these bodies are numerous and important. Under the Metropolis Management Acts, 1855, they are responsible for the paving, watering, cleansing, and lighting of streets, for local drainage and dusting; whilst under Nuisance Removal, Sanitary, and Diseases Prevention Acts, they discharge multifarious duties, including the removal of nuisances and the care of the public health, each employing for these purposes a staff, comprising at least one medical officer of health and one or more inspectors of nuisances.

It is no part of my duty this evening to pose as the apologist of metropolitan local government, but it would be unjust not to refer to a fact, to which universal testimony bears witness, that whatever the shortcomings of the system, the labours of these much-abused bodies have, in little more than a quarter of a century, made London to be the best paved, the cleanest, the best lighted, the best drained, and, may we not say, the healthiest great city in the world.

The Metropolitan Board of Works, like the vestries and district boards, is a creation of the Metropolis Management Act, an Act passed to make provision 'for the better local management of the metropolis in respect of the sewerage and drainage and the paving, cleansing, lighting, and improvement thereof.' In addition to a paid chairman, it consists of forty-five members who are not merely the delegates or deputies of the vestries and district boards, by whom they are elected, but are, I imagine, with three exceptions, themselves members of those bodies; so that the Board might be described as the quintessence of vestrydom. Probably few ratepayers, even among the severest critics of local management—those who extol the greater light at the expense of the lesser lights—are acquainted with this relation between the Board and the vestries, &c.

The members are elected for three years, one third retiring every year. The Common Council of the City sends three representatives. Six of the vestries send two each, and seventeen other vestries send one each, the remaining thirteen members being elected by the district boards. The Board has jurisdiction for certain purposes over the whole metropolis, an area of 75,000 acres, and has been entrusted with the carrying out of about one hundred Acts of Parliament. Some of these relate to great engineering works, like the main drainage and Thames Embankment schemes, involving the outlay of millions. Others are of comparatively small importance. Speaking generally, however, all have this feature in common, that they relate to matters affecting London as a whole, and require for their due execution an undivided authority.

Some of the work done by the Board, the main drainage for instance, is of the utmost value from a sanitary point of view, and yet the Board is only indirectly, and by accident, as it were, possessed of sanitary authority. Under the provisions of the Artisans' and Labourers' Dwellings Improvement Acts alone, it has power to appoint a medical officer or officers of health, but although in respect to some of the duties it has been called on to perform, skilled medical advice would have been of value, no such appointment has ever been made. It is admitted on all hands that the Board has done its work well, a fact creditable alike to itself and to its constituents.

The Metropolitan Asylums Board, which, as already stated, has, by force of circumstances, developed into a sanitary authority of the first importance, consists of sixty members, of whom one-fourth are nominated by the Local Government Board, the remaining three-fourths being elected by the thirty Boards of Guardians. In mode of election therefore the Board presents an analogy with the Metropolitan Board of Works, the managers being chosen by the representatives of the ratepayers; a system which, in practice, has been found to work well, seeing that the guardians, like the vestries, have almost invariably deputed their best men, the appointment in either case, moreover, being regarded as an honourable distinction. What I would call the sanitary work of the managers—for they have multifarious duties strictly appertaining to the relief of different classes of paupers—has been well done; and notwithstanding occasional complaints on the score of excessive expenditure, there can be no doubt that they have rendered great services to the metropolis from a public health point of view.

The scheme of metropolitan government, for which I have already expressed preference, contemplates the retention of the vestries and district boards in a local or executive capacity, under such control as may be necessary to secure unity and uniformity. It is with the constitution of this central authority, therefore, that we have now to deal; and I would say, *in limine*, that the continued separate existence of the Corporation and the Metropolitan Board appears to be incompatible with the formation of such an authority, unless, indeed, the Corporation should be permitted under some reformed constitution, to maintain its rule in the City, leaving the rest of the field clear for the Metropolitan Board. Otherwise the question remains—Shall the Corporation, endowed with enlarged jurisdiction and the necessary powers, become in fact as in name the Corporation of London? Or, shall the Metropolitan Board of Works, with similarly enlarged powers, and under whatever name, extend its sway over the City? Prescription, historical prestige, and other like considerations, plead for the Corporation.

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The success that has attended the work of the Metropolitan Board suggests strong arguments in its favour. Whichever body may ultimately be chosen, I venture to express the opinion that if the members of the central authority could be chosen, like the members of the Board at the present time, by and from the vestries, themselves immediately representing the ratepayers, London would have a better prospect of being well and wisely governed than if the members should be elected directly by an appeal to popular suffrages. Should the plan of direct election by the ratepayers find favour, we can but hope that one of the most honourable distinctions of the present system of local government, its absolutely non-political character, may be preserved: it would be a calamity indeed should metropolitan government ever become the subject of political warfare.

However constituted, among other duties the new authority should take over those now performed by the Asylums Board with regard to hospital provision, &c., together with the hospitals and ambulances; it should have power to acquire on equitable terms the property of the water companies; it should be the vaccination authority, and, in addition to medical and other officers concerned with public vaccination, it might appoint coroners and registrars of births, deaths, &c. The provision or control of cemeteries might not unreasonably be one of its functions.

For the discharge of the multifarious duties that would devolve upon the central authority perhaps you imagine I contemplate the formation of a Board which by sheer force of numbers would be unwieldy? Not so; I am of opinion that the new authority need not be more numerous than the Corporation, which, as before stated, consists of 232 members. This number should prove ample, if we may judge from the amount of work got through by the Metropolitan Board with forty-six members, by the School Board with fifty, and by the managers of the Asylums Board with sixty.

Officers in plenty are ready to hand, and only one entirely new department would have to be created—one, however, of the highest importance and interest to us—that, namely, of Public Health. A principal medical officer of health—*primus inter pares*—would probably take charge of the City, which would naturally be the seat of government. To the office over which he presided, information in respect of the occurrence of specified infectious diseases should be forwarded by local medical officers daily, and these in return should be made acquainted with whatever it behoved them to know in regard to the occurrence of such diseases beyond, but adjacent to, their own districts. In like manner periodical statistical returns, on a uniform system, should be forwarded to the departmental office there to be collated and tabulated for general use. An annual report by each local medical officer of health, based on some agreed plan, should be prepared, printed, and sent at a specified time to the central office; on the foundation of these local reports, the principal medical officer would be charged with the duty of publishing a report relating to the metropolis, as a whole.

In this way, and assuming compulsory notification to exist, we should be kept informed from time to time of the state of the public health; we should be made cognisant of the very beginning of an epidemic, and thus we might hope for much success in efforts for 'checking or preventing the spread' of infectious diseases, which, as you are aware, is one of the principal duties assigned to us by the Act to which we owe our official position.

Having now in imagination got our central authority and so brought about unity in sanitary administration, I proceed in the third and last place to consider the 'probable benefits to be expected from such unity being attained;' and in the forefront I would place codification of sanitary laws, a measure which we know only awaits that reform in local government with which London has been threatened or tantalised these many years. With codification we may reasonably anticipate such additional powers as experience has proved to be necessary for success in the contest with preventable diseases. Among the first of these we may class 'compulsory notification,' without which the most diligent efforts to control and limit epidemic outbreaks can never be more than partially successful. The time has passed for insisting on the necessity of such a measure, the principle having been accepted by the profession, by the Government, as represented by the president of the Local Government Board, and even by Parliament itself. With notification I would bracket provision of hospitals, and I am not sure, having regard to relative importance, whether I ought not to have placed this first; for hospitals almost infallibly lead to voluntary notification, while even compulsory notification without hospitals is robbed of a great part of its value. Happily we have, or soon shall have, in the Asylum Board's hospitals, all the accommodation likely to be required for smallpox and 'fever,' whether in the acute or the convalescent stage, and in due course, I doubt not, the hospitals will come under the control of the central sanitary authority. For a year, at any rate, under Sect. 7 of the Diseases Prevention (Metropolis) Act, 1883, even the nominal stigma of pauperism will not attach to persons admitted into the hospitals, and the society might well make an effort in the coming session to get the provisions of this section made permanent. The opportunity is too favourable to be let slip, seeing that the President of the Local Government Board is with us, he having in 1878, and again in 1879, introduced a measure 'to remove disqualification by medical relief for infectious diseases.' By every inducement the sick should be encouraged to enter the hospitals, often the only means of securing isolation and safe-guarding the public. No charge should be made unless special accommodation were desired. For the most part the boards of guardians have acted judiciously in not attempting to obtain payment; the Asylums Board have ever kept open doors for all comers sent in conformity with the requirements of the Orders of the Local Government Board; so all we need now is that the sanction of law should be accorded to established practice, a course for which we can plead the high authority of the Hospitals Commission, who have said that 'it is desirable in the public interest to attract to these hospitals, even by the bribe of gratuitous treatment, all who will go thither.'

Persons suffering from a 'dangerous infectious disease,' and being 'without proper lodging or accommodation which would enable them to be properly isolated, so as to prevent the spread of disease to other inmates of the same house, and to be properly treated' should invariably be removed to hospital under justice's order as recommended by the Conference of Sanitary Authorities held in 1881:

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and the 26th section of the Sanitary Act 1866 should be so altered as to confer the necessary powers of removal.

Whenever the duties of the Asylums Board shall have been transferred to a central sanitary authority, no part of the machinery organised by the managers will be more appreciated than the ambulance service. You are aware that at every hospital a station has been, or is to be, provided. The facility, the comfort, the safety, and the rapidity with which the sick are now transferred from their homes to the hospitals, leave nothing to be desired. An ambulance steamer, moreover, has been specially constructed for conveying patients from a river-side wharf to the hospital ships at Long Reach, where the managers have obtained land for various purposes within easy reach of an estate at Darenth, on which they purpose to build a large hospital for convalescents.

So much with regard to the safeguards, *quâ* infectious disease, which we already possess, or hope to obtain, through the agency of the new Central Board, and as the results of unity in sanitary administration.

I pass on now to offer a few illustrations of the probable results of unity in regard to other branches of sanitary administration, and first with regard to water supply. Beyond doubt this should be in the hands of a central authority, and until we have such an authority, the companies will probably keep possession; although I note the intention of the Metropolitan Board to submit a scheme to Parliament next session. No scheme can be satisfactory that does not provide for constant supply of potable water from a pure source.

Baths and washhouses, not scattered haphazard, or placed in merely paying districts, but evenly distributed, should stud the metropolis as now do the board schools. Increased powers, including those for compulsory purchase of land, are required and would probably be conferred on a central sanitary authority which recognised the duty of providing baths and washhouses on this plan. Great benefits would be conferred by the provision of a large number of buildings on a modest scale to which the poor could resort for the purpose of washing clothing, &c. The question of public washhouses might with advantage be separated from that of public baths.

Mortuaries in like manner should be provided, the metropolis being treated as a whole without regard to parochial boundaries. The need of such accommodation is great and pressing, and it is a question whether increased compulsory powers for the removal of the dead—and I would add legislation to secure more speedy burial—might not properly be sought by a central sanitary authority. Disinfecting chambers for the free use of all classes should be provided on the same principle of distribution as mortuaries, and men should be specially trained for the duty of house disinfection after infectious diseases.

Public urinals and water-closets for both sexes are imperatively needed. It is not so much that the existing authorities are unwilling to make the necessary provision, for which they possess ample powers, as that the difficulty of obtaining sites has been found insuperable, owing to the weight of local opposition. Time and usage would gradually overcome this difficulty, once a certain number had been provided by a central authority acting for the whole metropolis and uninfluenced by sentimental objections.

I have already referred to the anomalous position occupied by the Metropolitan Board of Works with respect to slaughter-houses and other 'offensive trades,' and to dairies, cowsheds, &c. A central authority content to exercise a general supervision, and with the power of framing by-laws, would probably transfer the duty of inspection to the local sanitary authorities. As regards slaughter-houses, the Board would hasten the inevitable time when they must be superseded by abattoirs. Already, under the Slaughter-houses Act, 1874—that is, in nine years—the number of private slaughter-houses has been reduced from over 1,400 to something like 850, and the reduction goes on year by year by the extinction of the licences of the worst places, and this obviously without any public inconvenience. Many butchers renew their licences rather with a view to keep up the value of their premises than on account of any use they make of their slaughter-houses. Every year the dead meat trade increases in importance and, owing to increased facilities, and the use of refrigerating vans, meat is brought from greater distances.

Milk, like meat, comes from country districts in ever-increasing quantities and from greater distances, less and less being produced in and near town. The cowsheds have not undergone the same diminution in numbers as the slaughter-houses, but fewer cows are kept, if only because of the increased cubic space required. Under the provisions of the Contagious Diseases (Animals) Act, 1878, as you are aware, the carrying out of the dairies, cowsheds, and milk shops Order of 1879 was intrusted to bodies having no acquaintance with sanitary work, the result being that the main provisions of the Order were almost entirely neglected. Thanks to the efforts of this Society, among others, the Government, conscious of the mistake made in 1878, brought in a Bill in the last session to place the cowsheds, dairies, &c., under the sanitary authorities everywhere, save in London. Pressure of business, fortunately, compelled the withdrawal of the measure, but as it is sure to be introduced again next session, a strong effort should be made to secure their rightful position for the sanitary authorities. Whether we succeed or whether we fail in this effort, it will be a good day for London when the sanitary supervision of country dairies and cowsheds shall have been handed over to the sanitary authorities, to whom we may reasonably look for protection against a terrible danger, such as that so ably illustrated by Mr. Shirley F. Murphy in his recent report on the endemic of enteric fever in St. Pancras.

Before passing from questions relating to food, I may be allowed to congratulate the society on the partial success of their efforts to bring bakehouses under efficient supervision. The Factory and Workshop Act, 1883, *quâ* bakehouses, is a very imperfect measure; still it is something to have obtained for the sanitary authorities the power of inspection—a power of which sanitary officials, I doubt not, will make good use. For the proper regulation of bakehouses, an Act enabling the central sanitary authority to frame stringent by-laws is necessary. The duty of inspection and of enforcing the by-laws should of course be entrusted to the local sanitary authorities.

Increased powers of dealing with recurring nuisances are required, and would probably be conferred on a central sanitary authority. By means of by-laws such an authority should be able to deal

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effectually with the great 'refuse' question, which has on more than one occasion engaged the attention of the society. House refuse, I need hardly say, should be collected daily, and dustbins abolished. The offensive refuse of certain trades—butchers, fishmongers, poulterers, greengrocers, &c.—should also be collected daily, early in the morning, in suitable vehicles and at the reasonable cost of the producer. The refuse of stables and cowsheds should be collected frequently, if not daily, with like precautions and on the same conditions. So far as practicable refuse matters should be utilised; but to a considerable extent, especially in districts remote from railways or canals, it will be necessary to provide for the disposal of such matters by fire in apparatus of the so-called 'destructor' type.

Did time permit, it would be easy to enlarge still further on the benefits that may expected to result from unity in sanitary administration. I might descant on the necessity of a new Building Act, on sewer ventilation, on the disposal of sewage, and on many another subject that will readily occur to your minds, but I feel that I have already detained you too long, and so will bring my discourse to an end.

In so doing, let me repeat emphatically that in order to have good government, I see no necessity for material alteration in the constitution or in the work of the vestries and district boards. On the contrary, I affirm that they, or some practically identical well-organised authorities, will be found necessary for local administrative purpose, whatever the constitution of the new central authority. London is not merely a great city; it is a province of houses, half a million in number; its population of nearly four millions is greater than that of some kingdoms, the mere yearly increase being sixty thousand souls, while its area, exceeding one hundred and twenty square miles, is so vast that any attempt to govern it from one centre without local aid is but too likely to end in costly and disastrous failure.

THE PADDINGTON CANAL BASIN.—At a meeting of the Paddington Vestry on Nov. 6, a report was presented by the Committee recently appointed to consider the communication from the Local Government Board asking for information as to the alleged nuisance caused by the canal. The committee recommended the Vestry to pass a resolution concluding as follows:—'The nuisance complained of may to some extent be attributed to the manner in which certain trades are conducted on the banks of the canal; but the evil more particularly referred to by a resident of Paddington is in a great measure due to the unsanitary condition of the canal basin, which for a period of twenty-five years has baffled the energies of the local authorities. This Committee hopes, however, now that public attention has been called to the subject, that the Local Government Board will assist the Vestry in impressing upon the directors of the Grand Junction Canal Company the necessity of their adopting prompt and efficient means for mitigating the nuisance so long complained of.' Mr. Mark H. Judge, A.R.I.B.A., proposed the following addition to the resolution, viz.:—'That the Local Government Board be requested to institute an inquiry into the condition of the canal basin and the nature of the trades carried on in connection with the same in order that reliable data may be obtained for considering how best the nuisance may be removed.' This was seconded by Mr. Walter Hallet, and supported by Dr. Danford Thomas, but was lost, and the resolution as recommended by the Committee was unanimously agreed to and ordered to be sent to the President of the Local Government Board.

LABOURERS' DWELLINGS IN TOWNS.

By J. VESEY FITZGERALD, Barrister-at-Law.

PUBLIC attention has lately been a good deal directed to the question of the condition of the dwellings occupied by the labouring classes in our large towns, and most men are agreed that the condition of those dwellings is unsatisfactory. Both on political and on sanitary grounds it is most undesirable that a large proportion of the population should be badly housed. The recognition of this fact is important, but the problem of how satisfactory dwellings for the working classes are practically to be provided is one that seems still far from being solved. Legislation has been tried, and the powers now possessed by the various local authorities are large. It is well to see what those powers are, in order to be in a position to judge whether further legislation is likely to provide the improved dwellings which are so desirable, or whether their improvement is to be sought from some other source.

Many of our large towns are partly governed under the powers of private Acts of Parliament, and those Acts often contain clauses giving the Corporation powers for the removal or improvement of objectionable dwellings and otherwise for supervising the physical and moral well-being of their inhabitants. With these we cannot deal here, but there are three groups of public Acts of Parliament which affect the subject, and with whose provisions the public seems to be practically unacquainted. The first group, the Labouring Classes Lodging-houses Act, 1851, and the Labouring Classes Dwelling-houses Acts, 1866, and 1867 (14, 15 Vict., c. 34, 28 Vict., c. 28, and 29 Vict., c. 28) enables Corporations and other local authorities in towns to provide or erect buildings suitable for lodging-houses, for the labouring classes, and to make such reasonable charges for their occupation as they think fit. For the purpose of the Acts they may appropriate land they possess, or purchase or hire lands or houses, and may borrow from the Public Works Loan Commissioners part of the money required, repayable over a period of forty years. Any receipts and profits made by letting these houses go to the common fund, and all expenses incurred under these Acts are chargeable on it. The adoption of these Acts by a local authority is left entirely to its own discretion, and we believe they have been very little used.

The next group is known as the Artisans' and Labourers' Dwellings Acts. The first of these Acts, generally known as Torrens' Act, 31 & 32 Vict., c. 130, was passed in the year 1868. It gives power to the local authority of a district, if their medical officer reports any premises to be unfit for human habitation, to require the owner to pull them down or do such works as may be necessary to make them habitable. If the owner neglects to do the necessary works, the local authority may close the premises and do the works themselves, and obtain an order from the Court of Quarter Sessions making the cost of such work a charge on the premises. The expenses incurred by the local authority in pursuance of the Act are to be defrayed out of a special local rate, not exceeding twopence in the pound per annum, which they are empowered to levy for the purposes of the Act. Torrens' Act, it will thus be seen, gives power to local authorities to deal with the case of individual houses, and while it provides an elaborate machin-

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ery for the purpose, similar in scope, though larger than the powers contained in the Public Health Act, it does not affect unhealthy areas.

The next Act, Cross's, properly called the Artisans' and Labourers' Dwellings Improvement Act, passed in 1875 (38 & 39 Vict., c. 36), was intended to deal not with single houses, but with districts. By it, where a representation is made to a local authority by the medical officer that 'any houses, courts, or alleys within a certain area are unfit for human habitation, or that diseases indicating a generally low condition of health amongst the population have been from time to time prevalent in a certain area, and that such prevalence may reasonably be attributed to the closeness, narrowness, and bad arrangement or the bad condition of the streets and houses, or groups of houses within such area, or to the want of light, air, ventilation, or proper conveniences,' the local authority are to take the representation into their consideration, and, if satisfied of its truth, *and of the sufficiency of their resources*, may resolve that the area is unhealthy, and prepare a scheme for its improvement. The scheme must provide for the erection of dwellings within or near the area for at least as many working people as are displaced by the demolition of the old buildings, and provide proper sanitary arrangements. It has to be confirmed in the metropolis by the Secretary of State, and elsewhere by the Local Government Board, by a provisional order, which subsequently receives the sanction of Parliament. Under a scheme so confirmed, the local authority can purchase lands compulsorily, and are put in a better position than public bodies who do so under other Acts. Instead of separate arbitrators being appointed by the parties to value each plot of land taken, as is commonly the case where lands are acquired under the provisions of the Lands Clauses Acts, a single arbitrator is appointed by the Home Office or Local Government Board to value all the premises taken in the district. Moreover, a practice which has grown up among valuers, in case of premises purchased compulsorily, of adding 10 per cent. to their value as compensation for the compulsion, is expressly forbidden in case of premises comprised in a scheme for clearing an unhealthy area.

This Act has twice been amended, in 1879, and again in 1882. In 1879 the amount of purchase money payable for premises taken in an unhealthy area was further limited by 41 & 42 Vict., c. 63, which enacts that the arbitrator is to ascertain whether those premises were in such a state as to be a nuisance, and, if so, to estimate the cost of abating the nuisance (for which ordinarily the owner of the premises is liable), and deduct such cost from the amount payable for the premises taken. The arbitrator is also empowered in certain cases to allow the local authority to acquire and pay for only a part of a building, whereas under the Lands Clauses Acts, in case of a compulsory purchase, the whole must be taken. The obligations of the local authority were further lightened by empowering the confirming authority to excuse the erection of some of the requisite dwellings for the working classes within the area, if this should appear desirable. This power of excuse was again extended by the Act of 1882, 45 and 46 Vict., c. 54, which also further limits the claims for compensation, by enacting that nothing is to be allowed for improvements or alterations made in the premises taken after the advertisement of the improvement scheme. This last provision is directed at a lucrative business which has grown largely of late years, of buying or adding to premises which are going to be taken by a company or public body, with a view of making a profit out of the compensation paid for taking them.

Torrens' Act was amended in 1879 by the Act 42 & 43 Vict., c. 64, extending to it the provision of the Act of 1875, which forbids any addition in respect of *compulsory* purchase to the price of premises taken under the Act; and at the same time the position of the owner was slightly eased, as he was given the option of requiring the local authority to purchase his premises instead of doing the required works on them himself. The Act was again amended in 1882 by 45 & 46 Vict., c. 54, and a local authority has now power to require the removal of a building, not in itself unhealthy, if its situation is such that it is the cause of unhealthiness in the surrounding buildings. Moreover, if the effect of the removal is in the opinion of the arbitrator to increase the value of the surrounding buildings, such increase may be charged on them, and thus they and not the rates may practically have to pay for the cost of removing the obstructive buildings. The Act of 1882 also provides that a local authority may proceed under Torrens' Act for the removal or improvement of any group of houses not exceeding ten in number, instead of preparing an improvement scheme which requires the sanction of Parliament, and of course is a somewhat tedious and expensive proceeding.

The above necessarily short and imperfect abstract of these three groups of Acts of Parliament will serve to give some idea of the powers which the local authorities of our large towns have for improving the dwellings of the working classes in their districts. If they consider the existing accommodation for the working classes to be insufficient, they can add to it by providing such houses as they deem necessary. They cannot, it is true, acquire lands compulsorily for this purpose; but as they are not limited in their choice of sites, the absence of compulsory powers will not prevent their being able to provide such houses if they deem it desirable to do so. Practically, the only limit to the provision of fresh dwellings for the working classes wherever the existing accommodation is insufficient, is the amount of expense which a local authority, representing the ratepayers of a district, feels justified in incurring. But as there is no obligation on local authorities to incur this expense, merely in order to alleviate an existing deficiency of accommodation, the power to provide fresh working men's dwellings is little used. Where existing dwellings are so unsanitary as to be a nuisance, local authorities are less unwilling to stir, and moreover they *may* be compelled to act by the interference of the Government. In dealing with such dwellings they have a choice of two courses open to them. They may either themselves proceed under Torrens' Act, as now amended, and demolish or alter single houses or groups not exceeding ten in number, which are unhealthy in themselves or the cause of unhealthiness in their neighbours, and may defray the cost of such work out of a special rate not exceeding *2d.* in the pound levied for the purpose. Or they may set to work on a larger scale, and, by means of a scheme approved by a Government Department, and confirmed by Parliament, pull down and rebuild the houses over a large area, without any limit as to expense, except such as is imposed by

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their own estimate of the ability of the districts to bear it, and the necessity of obtaining Government sanction for the proposed work.

Though the Acts are encumbered with a number of provisions as to details, which cannot be dealt with in the limits of this article, and which, no doubt, render their practical working troublesome, the powers possessed under them by local authorities are large, and, one would think, sufficient to secure great results. But we are met with the fact that very little has been done. Some rookeries have no doubt been removed in the metropolis, and improvement schemes have been sanctioned in a few of our large towns; individual houses have been pulled down or repaired in different localities; but no impartial observer can deny that many unhealthy areas still remain, even in towns where improvement schemes have been put in force, and that the houses are numerous which ought to be closed or pulled down if the sanitary requirements of the inhabitants were really looked after. The explanation of these facts is easy. The Acts, though they contain some powers of compulsion, are practically permissive, and it rests with local authorities themselves to determine whether they will do anything. The local authorities are composed of ratepayers, often of the owners of the property which ought to be dealt with under these Acts, and they naturally are unwilling to incur expenses except where they are obliged to do so. Even with the safeguards against exorbitant compensation which are provided by the Acts, unhealthy houses cannot be removed nor unhealthy areas cleared except at a considerable expenditure. Local authorities seldom, if ever, buy land or devote what they possess for the purpose of providing workmen's dwellings; and the obligation to erect dwellings for the labouring classes on the cleared areas, even now that it may be partly dispensed with, acts as a great check on improvement schemes, because the erection of artisans' dwellings on expensive sites rarely pays a fair percentage on the capital expended. In some towns, as, for instance, Birmingham, an improvement scheme has been adopted so as to enable the local authority to acquire, on the favourable terms given by the Acts, houses which certainly were not the worst in the town, and in the cleared area to create new business streets with valuable frontages; treating the erection of dwellings for the working classes as a secondary consideration, if not neglecting it altogether. The necessity for obtaining the sanction of a Government department for an improvement scheme ought to be a sufficient safeguard against the perversion of the powers of the Artisans' and Labourers' Dwellings Acts into being merely Acts for the improvement of towns. Local authorities have powers for this purpose given by the Public Health Act, and often by local acts of their own besides. The Artisans' and Labourers' Dwellings Acts are intended not only to get rid of unhealthy dwellings for the working classes, but to provide them with healthy dwellings instead. Schemes which do not do this, but merely drive them from their old habitations to seek accommodation elsewhere, probably in buildings that are not much better than the old ones which have been condemned, are not in accordance with the spirit of the Acts, and are not for the benefit of the community at large. Houses that are in an unsanitary condition ought undoubtedly to be put right or pulled down, but if this is done in such a way as only to produce overcrowding elsewhere, little good is effected by the work originally undertaken. Local authorities ought to see that expenditure on improvement of dwelling-houses is an expenditure which is likely to be beneficial indirectly to the district, by enhancing its prosperity and its rateable value, and thus that it may be *worth incurring* even from a ratepayer's point of view.

As a remedy for the overcrowding which is the cause of the difficulty felt in dealing with the question of labourers' dwellings in towns, it has been proposed that the working classes should cease in a great measure to live in the towns, and should instead come by railway to their work. To a slight extent this can no doubt be done, and the Railway Management Act of this year will probably induce the railway companies to increase the number and convenience of their workmen's trains. But this can be but a partial remedy; for the expense, slight thought it be, and still more the time necessarily occupied in travelling between the suburbs and their work, necessarily limits the number of working men who can or will consent to live anywhere except in the town where they are employed. Every destruction of an unhealthy dwelling, or removal of inmates in excess of those for whom there is room, unless fresh dwellings are provided, has a tendency to produce fresh overcrowding in the *immediate neighbourhood* of the house which has been improved. If the dwellings of the working classes are to be kept healthy and preserved from overcrowding, it is necessary that at least as much healthy accommodation should be provided as there is unhealthy accommodation condemned. Private individuals have done something, and the limit to what they will do has not yet been reached. As has been pointed out recently, employers of labour might well provide dwellings for their workmen in towns, as they often do now in the country. Local authorities, though they have ample powers, do not seem inclined to use them, and in this respect are often neglectful of their duty as regards the health and well-being of their districts. The principle of local self-government is on its trial, and if it should be found that the representatives of the ratepayers refuse persistently to supplement private efforts, and to see that the dwellings in their district are decent and healthy, it may be that the State will be forced to interfere, and to substitute duties for the powers which the local authorities now possess. The time for such interference has not yet arrived, but it is to be hoped that the attention which has been lately directed to the subject of healthy dwellings will stimulate both individuals and local governing bodies, so that such interference may remain unnecessary.

MORE than fifty patents for the making of ammonia have been taken out within the last two years in England, America, Belgium, France, Austria, and Germany. Many of the schemes have been patented in all the countries at once. The patents apply to gas works, oil works, blast furnaces, alkali works, and sewage works.

THIRTEEN AT TABLE.—The statistical probability of the superstition that if thirteen sit down to table one of them will die in the course of the following twelve months is given in a French paper, from which it appears that the chances are, that if the average age of the company is 10 years there ought to be 134; 15, 131; 20, 129; 25, 124; 30, 119; 35, 112; 40, 103; 45, 90; 50, 73; 55, 54; 60, 35; 65, 25; 70, 17; 72½, 13 persons present to make the realisation of the theory scientifically likely.

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INSANITARY DWELLINGS IN WHITECHAPEL.

By DAWSON WILLIAMS, M D.

Honorary Secretary of the Parkes Museum of Hygiene.

IN compliance with the request of the Chairman of the National Health Society, I visited Whitechapel and examined certain houses and areas in the parish of St. Jude and in the adjoining parish.

My attention was first directed to Queen's Place, High Street, Whitechapel. Queen's Place is a narrow court running about north and south, and entered from High Street, Whitechapel, by a narrow, tortuous passage, which passes under one of the houses in High Street. This court contains, or appears to contain—for, as I shall subsequently have to point out, there seems to be some legal doubt on this point—five houses. On the eastern side of the court there are the entrances to three houses.

The door of the first house was open, and I entered without any formality, and it is evidently open to any chance passenger in need of shelter or actuated by any motive of curiosity or by any other less worthy motive to do the same. This house is an old house, and the passage and staircase were dirty, though without offensive odour. On the first landing-place there was a housemaid's sink and w.c. The w.c. was very small in area, and most offensive; the water was derived from a cistern immediately above the w.c.; the closet had neither valve nor pan, and the water, when the 'pull-down' was used, ran so slowly that neither the closet nor the trap below it can ever be properly flushed; the woodwork had been recently washed; the waste-pipe from the sink, as well as the overflow-pipe from the cistern, could be traced to the w.c., and we were told by the man in charge for the landlord that these pipes opened directly into the house drain. If this is correct, and most probably it is, the drain must ventilate in part at least on to this landing, as the sink has only a bell-trap, a form of trap which, as is well known, is quite inefficient. The rooms in this house that I had an opportunity of seeing were low, dark, and ill-ventilated. In the houses on this side of the court it is impossible that there can be any proper ventilation; in front the houses open on to the narrow yard or court, surrounded on all sides by high houses, and in which there can be but very imperfect circulation of air, and at the rear there is no yard or open space of any kind. Under these circumstances there can be no through ventilation. I entered an attic room in the old house; the room had a sloping roof and was dirty; the window was shut when I entered, but the room was full of smoke, so that no offensive smell was noticed. The room contained one bed, and was in the occupation of a man and his wife, and they had, according to the woman's statement, three children. I was, however, informed, on unimpeachable authority, that the number of constant occupants of the room at night was considerably larger than this, and that ten people commonly slept in this one small room, which, it will be remembered, was in the attic with a roof so low at the lowest part that it was not possible to stand upright; on the landing outside this room was a kind of cupboard with a glass door, not occupied at the time of my visit, but which, I was informed, was to be let along with the attic room as a second room. Returning to the court-yard, I noticed that the common dust-bin for all the houses in Queen's Place was a kind of recess in the wall of the old house on the east side; the quantity of refuse, however, was not great, and I was informed that the dust-bin was frequently emptied, and that no nuisance arose from it. At the further or north end of the courtyard was a small lean-to shed, which contained two water-closets. The shed was 39 inches broad, and about 9 feet in length; at each end was a water-closet. The whole had been recently cleaned out, and seats and floor were exceedingly wet; I was told also that both water-closets had been recently flushed; nevertheless, the odour in the shed, and in the part of the court in its immediate neighbourhood was most offensive. Neither of the water-closets had any water supply, there was no pan or valve, and the vessel was dirty; a bucket of water is poured down these water-closets occasionally, but there appeared to be no provision for flushing after use; when it is remembered that these water-closets are in a court open to the street, which can be entered by any person, it is not surprising that the shed and closets are offensive. On the west side of the court there are two doors which lead apparently into two separate houses; behind these houses is a small passage, which is called a 'yard;' it is 41 inches wide (about a yard and an eighth), and is bounded by a high wall. It contains at one end a small offensive water-closet which has no water supply; this water-closet is occasionally flushed with a bucket of water carried through the house from the water-tap in the front yard. The water supply for Queen's Place is constant, and the necessity for cisterns for drinking water does not exist.

From the report on the sanitary condition of Whitechapel for the year 1876 by the medical officer of health, Mr. John Liddle, I learn that a warehouse formerly stood on the area now occupied by the west side of Queen's Place, 'but the owner of the ground thought it would be more profitable to him to take down the warehouse and erect dwelling-houses on the site. Having cleared the land the owner commenced building two dwelling-houses of six rooms in each, and having left a space in the rear of these two houses of only 100 square feet' (that is the narrow passage a yard and an eighth wide and containing an offensive water-closet above described), 'I informed the builder,' continues Mr. Liddle, 'that he would not be allowed to complete them in the manner contemplated . . . . Notwithstanding my remonstrance, the houses were completed, each having two rooms on a floor; but the builder complied, and apparently with effect, with the provisions of the Building Act by making a door between the houses, and then it was said that the two houses were only one house, and that the space in the rear was 100 square feet, which was all that the Act required. This arrangement was considered by the district surveyor to be legally satisfactory; but when the houses were tenanted the doorway was built up, thus again converting the one house into two houses.' From these facts it appears to be perfectly evident that the man who erected these houses had succeeded in evading the provisions of an Act of Parliament: the means taken to obtain the sanction of the district surveyor were in themselves an admission that the requirements of the law had not been complied with, otherwise it would have been unnecessary to knock a door between the two houses in order to be able to show it to the district surveyor;

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after this official's inspection the doorway was built up, and the houses then ceased even technically to comply with the provisions of the Act. I fully endorse the opinion expressed by the medical officer of health, and consider the court to be unfit for habitation owing to the confined space in which it stands, and the nuisance caused by the public privies. This court is calculated to become a hotbed of disease, and it is not surprising to learn that the moral atmosphere is as tainted as the material; it has been noticed by correspondents in the local press as a centre for quarrels and noise, and I am informed that within a few months three serious charges, involving questions of life and death, an attempted suicide, and a large number of minor offences had their origin in Queen's Place. Memorials have been presented with regard to this court under the Artisans' Dwellings Act, and last February a deputation of ratepayers waited on the vestry to urge the expediency of some action to remedy the evils here enumerated. No steps have, however, been taken, except by the landlord's agent, who has paid some attention to the cleansing of the w.c.'s, in the hope, no doubt, that the law may again be evaded, by thus making clean 'the outside of the cup and platter.' *

Inkhorne Court is another of those narrow, ill-ventilated courts where the houses are crowded on to a space altogether too small. The houses are crammed; each room, as a rule, being in the occupation of a separate family. All the rooms are in front, the houses, in fact, having no back. In one house which I entered, the water-closet was on the roof of a shop at the back of High Street, Whitechapel. There was a cistern to supply it with water, but this was empty, and the water was entering very slowly. The sink of the house was in one of the living rooms, and close by a bed. In another house the cistern which supplied the house was dirty, and had no cover; the supply cock also was out of order, so that water was liable to overflow, and had on several occasions flooded the floor and soaked through into the rooms below. To obviate this, the cock was tied up to prevent the water entering at all. In this way the cistern was constantly liable to run dry. The woman who, with her family, occupied two rooms at the top of this house, complained bitterly that it was necessary to keep her doors locked and everything in her two small rooms, owing to the street door being never closed, so that vagrants commonly slept on the stairs, and on the landing between her two rooms. A few nights earlier an attempt had been made to steal a large chest which her husband had left outside the door of their room. The water-closet for this court was at the end of the yard in a small shed; it was provided with a small 'water-waste-preventer,' which was out of order, so that no water could be obtained for flushing the water-closet. Under these circumstances, it is hardly necessary to say that it was foul and offensive. The small yard on which the water-closet stands contains an untrapped drain. Opening on to the yard was the back room of a confectionery shop, which had its front in the street.

Angel Alley is a narrow passage in which ventilation is impossible, owing to the manner in which the houses are crowded together. At the end of the alley where these houses are situated is a stable entered by an iron grating, and close by are two w.c.'s; both were foul, and emitted a most offensive stench; one was in a narrow angle between the house and the stable, the other was under the house, and contained a foul, offensive, untrapped sink; there was no water supply, and no means of flushing either w.c.; occasionally somebody threw a bucket of water down. Even if the inhabitants were more careful it would be impossible to keep these w.c.'s and yards clean, owing to their being open to the street, and, in fact, though not in intention, public privies. In Fashion Court I came upon a man cleaning out one of these privy-yards, which had become too foul for longer endurance; as he explained to me, he did not clean out the yard because it was his duty, but because it was so fouled during the night that it was impossible to cross it, and the offensive smell permeated every room in the house; one of the sinks in this yard was stopped up by the refuse thrown down. I entered several rooms in this neighbourhood where the atmosphere was excessively foul, and where the strong ammoniacal odour excited a feeling of nausea.

In the greater part of the district that I went over there is a constant service of water, which is drawn from taps supplied directly from the mains without the intervention of cisterns. The water therefore is pure, or, at least, is not contaminated by the air and other foulnesses of these narrow courts and alleys. Were this not the case, there can be no doubt that sickness and fever would be even far more common than it is. In one large house in Pelham Street, however, the drinking water was obtained from a cistern on the third story. The cistern was at the top of a small projection from the main block; in this projection were the w.c.'s and sinks; the cistern was immediately under the slate roof of this projecting part. The roof was just under a window, and the children of the house playing at this window and on the roof had broken the slates, so that the cistern, which was large and shallow and had only this slate roof to protect it, appeared to be very liable to contamination. There was a small door on the staircase by which admission to the cistern could be obtained for the purpose of cleaning it; the key of this door, however, had been lost, and as the children were apt to crawl through and tumble in to the drinking-water cistern the door had been screwed up. On opening this door I found the cistern more than half empty; the bottom was covered by a deposit of fine brown mud; on the surface of the water floated

* Since this report was written, Mr. Isaac Battam, sanitary inspector, has reported to the Whitechapel District Board of Works that, a complaint having been made by the Rev. S. A. Barnett, vicar of St. Jude's, Whitechapel, of the overcrowding of the houses in Queen's Place, Whitechapel High Street, he (Mr. Battam) in company with two gentlemen connected with the Rev. S. A. Barnett, and Dr. Allen, made a visit between 12 and 1 A.M., but failed to find that any overcrowding existed. This court contains four houses, numbering altogether seventeen rooms, these rooms at the time of the visit being occupied by fifty-three persons—namely, thirty-five adults and eighteen children, and not one hundred persons as alleged. Dr. Loane, medical officer of health, also reported:—Queen's Place formed part of an area which was included in an official representation made by the medical officer in April 1876 to the Metropolitan Board of Works, but although that Board included most of the property the subject of that representation in a scheme, yet Queen's Place was rejected. Dr. Loane adds that there is a great deal that one could wish were otherwise than it is, in Queen's Place; but the death-rate for the last few years has not been above the general average of the district; on the contrary, has been somewhat below it. 'The ventilation of the court is far from good, but in this respect it is not worse than some others within the district, and I may add that, were I to select a court as one which should be demolished by the board, Queen's Place would not be the first I should select. The construction of Queen's Place and the buildings in it are such that unquestionably need constant supervision on the part of the sanitary inspector, and I am of opinion that if ventilating shafts were carried up to provide ventilation much nuisance would be avoided.' The suggestions of the medical officers were referred to the committee of works; and copies of the reports of the sanitary inspector and the medical officer were ordered to be sent to the Rev. S. A. Barnett.

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apples, decaying leaves and other such ; I also removed from the cistern a piece of about three inches long by half that in width, ently from an ox, and a quantity of slimy offen- natter which appeared to be a portion, very decomposed, of the bowel of some animal. ondition of this cistern constitutes a very real r, especially in face of the possible importa- f cholera into the East End of London. It is fficult to imagine how this large unprotected n might become contaminated with the cholera ; and granted that this contamination oc- l, most probably the majority of the inhabitants house, or at least of those who drank water, become affected by cholera; from such a the disease could readily spread. It is almost ss to say that in these houses and in the whole is neighbourhood, filters are unknown, and r of the precautions recommended for water is under suspicion, namely 'to boil and filter,' ken.

hink that it is impossible to reprobate too ly the greed of gain which has led to the erec- f such courts as these. There would seem to be rous instances in which the owner of a ware- standing in the rear of a house in a populous bourhood has pulled down the warehouse and d a double row of houses with a narrow alley en them on the area originally occupied by the arehouse; access to the court is gained by g a narrow passage under the house in the street. Every means that ingenuity can sug- s taken to evade the provisions of the Acts of ment that regulate the erection of tenement s, and equal ingenuity is exhibited in per- ting the overcrowding of these limited spaces. nces are on record where a landlord, compelled ect new houses owing to old ones actually ning to tumble down, has escaped from ovisions of the law in the following manner. nas first of all taken down the front wall nd rebuilt this; then he has taken down the wall and rebuilt that; finally, he has taken off of and rebuilt the roof. In this process he has ally contrived to add a few more rooms so as to a few more families on to the already crowded . By this ingenious plan he evades the pro- s of the law dealing with the erection of new s. The houses are still old houses, although nave been renewed in this piecemeal fashion. her the houses erected on the site of these old nouses, or enlarged and rebuilt in this curious nave any means of thorough ventilation is more ter of accident than calculation. If the adja- rea is covered by some low sheds, so much the ; but, if not, the houses are built all the same, ne law is evaded in some such way as it was in se of Queen's Place. Happily, the number of narrow courts and back-to-back houses has decreased by persistent efforts, but many are existence, and constitute a continual source nger to the public health. Extensive areas in istrict have been cleared of their houses; that ay, the houses have been pulled down, and of the material has been carted away, but many s may be seen roughly enclosed by railings and ings, still covered by the *débris* of fallen houses, stagnant pools of water, and having scattered them dead cats, rotting vegetables, and other less garbage. These spaces seem to consti- a fresh danger, and to afford a condition of things very favourable to the development and perpetuation of the germs of certain forms of disease.

THE EXCESSIVE DEATH-RATE OF NEWCASTLE.

(By our Own Correspondent.)

There is no city or town in the United Kingdom, which up to the present year has exhibited more gratifying results of the attention paid to sanitary matters than Newcastle-on-Tyne. As Mr. Armstrong, the medical officer of health, pointed out in his admirable paper read before the Sanitary Congress last year, the average death-rate had been decreased by 10 in as many years, whilst during the same period the prevalence of typhus had been diminished to one-fifth of its previous average. The citizens were congratulating themselves on the steady decline of the death-rate, when their hopes received a rude shock, by a relapse since the commencement of the present half-year to their former unenviable position. In the quarter just ended (Sept. 30) the births in Newcastle numbered 1,312, exhibiting a rate of 35·2 per 1,000 of the population, estimated to be 149,464 in the middle of this year. The deaths during the quarter reached 1,009, or equal to a rate of 27·1 per 1,000, being 7·2 more than the average of the 28 large towns, and for several weeks standing highest in the Registrar-General's returns, the maximum being reached during the week ending September 29, when 33 in the 1,000 was recorded; since September 29 Newcastle has continued to exhibit a death-rate much above the average; for the week ending November 3 it was 26, in contrast with 20·1, the average of the twenty-eight large towns.

Various theories, more or less plausible, have been advanced as to the cause of this excessive mortality, but the aptness of some of them lose much of their force from the fact that the evils complained of existed to almost the same extent as at present, during the time Newcastle exhibited the most satisfactory returns, showing that the unsanitary condition is of more modern growth. It may be noted that Newcastle is most favourably situate for drainage purposes; many of the chief thoroughfares being built on a steep declivity extending to the banks of the Tyne which forms its boundary on the south. Going eastward, there is a fall of 180 feet in ¾ of a mile, and westward there is a fall of 350 feet in about a mile and a half. Under the central parts of the City there are several small rivulets, or *burns*, as they are called in the north, which are now covered over, and utilised as common sewers, being eminently adapted for the purpose; they empty themselves into the Tyne below tidal reach.

With such physical advantages, and possessing a remarkably efficient staff of official sanitary officers, the recent unenviable pre-eminence of Newcastle in the mortality returns has naturally evoked much surprise and uneasiness in the City. The principal distinguishing feature in which Newcastle differs from the majority of other large towns in England is the fact that most of the labouring class live in tenemented property, or dwellings consisting only of one or two rooms, according to their means, many ordinary sized houses being thus made to provide accommodation for several families, though not originally

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built or conveniently arranged for the purpose. This may give a clue to what may otherwise appear inexplicable.

Amongst the various causes assigned for the excessive mortality is the deficient ventilation of the sewers, and the want of furnaces or other modes of destroying the noxious gases emanating from them. In the Byker district, complaints are made that the sewers are of insufficient capacity, having been laid down when the population of the locality was but a tithe of what it is at present without thought of future requirements. Mr. Fowler, the late Borough engineer, exonerates himself from blame in this matter by stating that he was not permitted to remedy this acknowledged defect thoroughly by the amateur engineers in council, who insisted on a patching up policy.

The prevalence of the open ashpit system, with its rapid accumulation of fæcal matter, has also been blamed as a main factor of the excessive death-rate. The existence of public slaughter-houses in the city, the offal from which is daily swept into the common sewers, polluting the atmosphere wherever they have vent; the deficiency in the quality and the quantity of the water supply; these, and other minor grievances of old standing, have been credited as contributions to the recent abnormal death-rate. There is a widespread opinion in Newcastle, that the principal cause is the crowding together of the labouring classes in the centre of the city, consequent on the demolition of their dwellings by the Corporation to make way for the new streets, without any provision being made for re-housing them. Upwards of 1,000 persons have lately been evicted from the Pandon district alone for this cause, and have sought shelter wherever they could, regardless of sanitary considerations. We need not be surprised to find that when a number of people of this class herd together in a crowded tenement, disease breaks out, and the weakest succumb. Out of the 1,009 deaths recorded for the quarter ending September 30, 240 were those of children under one year old. An epidemic of measles proved fatal to 123 children during the above period. It is impossible to state how many children died from neglect. Anyone who has seen the way in which poor children in the north go about the streets barefoot and ill-clad during the most inclement weather, cannot hold their parents free from blame if these children fall a prey to disease. In some cases they seem to be literally regarded as *encumbrances*, and treated as such. A short time ago we spoke to a rough-looking woman who but a few weeks before had lost a child from bronchitis: she was then carrying a sickly-looking infant, about ten weeks old, in her arms, with scarcely any covering, on a bitterly cold day. We ventured to suggest, that considering her recent bereavement, she should take greater care of her child. She replied, that it would have to take 'pot luck' like the rest. We found, on inquiry, that this child, like the rest, was insured in more than one of the Industrial Benefit Societies which abound in the country; and it was impossible to stifle the impression that its parent would not look on its decease as an unalloyed calamity. It would be an unjust reflection on the labouring class to regard this case as a general type of the want of affection they show towards their children, as every medical practitioner can cite many instances to the contrary, but they also tell us that in an extensive practice amongst the labouring classes and others, cases similar to the above are by no means uncommon; and that one of the greatest hindrances to success they meet with is the folly or culpable carelessness of parents towards their children when under medical treatment. It must be obvious that the best sanitary supervision or medical advice is powerless against the gross folly or ignorance of parents; and, as upwards of 60 per cent. of the deaths which have occurred in Newcastle during the past four months have been those of children under five years of age, it is impossible to conceal the suspicion that a large amount of parental neglect is present in that city. This, coupled with the overcrowding already described, and the want of sufficient sanitary conveniences where such overcrowding exists, seems to afford those best acquainted with the city the most reasonable explanation that can be offered regarding its excessive death-rate. We feel assured that the official sanitary staff have done all that is possible under the circumstances, but their labours will be fruitless if they have not the active co-operation of the householders themselves in their efforts to promote the public health.

THE 'BUILDER.'—Mr. George Godwin, after having conducted this journal more than thirty years, has given up the office, which has been assumed by Mr. Tatham who has for some years been sub-editor of the *Builder*.

IMPORTANT SANITARY PROSECUTION.—At Birmingham several owners of property and occupiers of houses have been summoned for neglecting to disinfect their premises after the outbreak of cases of small-pox and fever. The magistrates said the importance of such prosecutions in the interests of the public health could not be overestimated, and they imposed heavy penalties, varying from 1*l.* to 5*l.* and 6*l.* each.

A HEALTHY VILLAGE.—The village of Kilham, near Driffield, Yorkshire, has had a remarkable death-rate for the past ten months, only nine persons having died—namely, four adults and five infants. The population is 1,200. There are living in the village over twenty octogenarians, and there is one old lady who has lived in the same house for eighty-seven years; in a few days she will have reached her ninety-ninth year.

AN APROPOS VERSION OF AN OLD JOKE.—"That stove saves half the fuel," said an ironmonger. "Thin I'll take two of them, and save it all," replied his customer.

FROM a recently-published return it appears that the total number of works registered in Devonshire under the Alkali Works Regulation Act, 1871, was twenty-two at the close of 1882, two of these being sulphuric acid works, nine chemical manure works, eight ammonia works, and three cement works. In Cornwall thirteen works were registered, being one alkali work, one sulphuric acid work, five chemical manure, and six ammonia works.

A SIMPLE arrangement for the consumption of smoke has been invented by Mr. J. S. Barwell, of Cincinnati. On the bridge wall of his furnace he constructs a section of tubes of fireclay, the tubes being 2 feet in length, and 2 inches in diameter. He starts the fire with coke, and the tubes soon become red-hot; after which, no matter what fuel is used, the smoke disappears in passing the fireclay tubes, and all beyond them is pure white flame. The cost of reconstructiug a furnace with this device is about 3*l.*

THE Local Board of Sandbach have received a sharp letter from the Local Government Board, declaring them in default in not providing a sewerage system and proper water supply. The town water is described as little better than sewage water, and the numerous cases of fever that broke out led to a Government inquiry. The Board have been allowed three weeks to do something to remedy this state of affairs, and in default their dissolution is inevitable.

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HINTS TO SANITARY INSPECTORS.

(*Continued from page* 111.)

CHAPTER IV.—(*Continued.*)

§ 28. *Cesspools.*

Law as to Cesspools.—It is a matter of the greatest importance that the inspector of nuisances should be thoroughly acquainted with all the various matters appertaining to cesspools. Cesspools must always be regarded with suspicion, and are only permissible where there is no sewer or other suitable outfall from the house.

Indeed, the Public Health Act, by its 23rd and 25th sections, only tolerates the existence of a cesspool when there is no sewer into which the drainage of a house can empty within 100 feet from the site of such house. By sect. 39 the local authority must provide all cesspools that within their district are constructed and kept so as not to be a nuisance or injurious to health. Anyone who in an urban district allows the contents of a cesspool to overflow or soak therefrom is liable to a penalty not exceeding 2*l.*, and to a further penalty of 5*s.* a day while the offence continues (sect. 47.) In the case of Womersley *v.* Church (17 L.T. [N.S.] 190), where sewage percolated from a cesspool through the soil into a well on an adjoining property, the Court restrained the use of the cesspool in such a manner as to pollute the water in the well. Sect. 41 of the Act provides that on the written application of any person to a local authority stating that a cesspool is a nuisance or injurious to health, the local authority may empower their medical officer of health or inspector of nuisances to enter the premises and cause the ground to be opened for the examination of such cesspool (see p. 16). Sect. 168 gives power to urban authorities to make by-laws *inter alia* as to cesspools in connection with buildings. The by-laws proper to be made in this matter are suggested by what follows; but it may be said shortly that no cesspool should be allowed within, say, 50 feet of a dwelling-house, or within 60 or 80 feet of any well, spring, or stream of water used for drinking or domestic purposes, and that every cesspool should be so constructed and placed as to afford ready means of access for cleansing purposes. In no case should the cesspool have any means of communication with a sewer.

Classes of Cesspools.—Cesspools may be divided into several classes.

(*a*) Those which are built of dry-steined walling, meant to intercept the solids and allow the liquid wastes to be absorbed by the earth. This class of tank is the most dangerous, and should never be permitted in the near neighbourhood of a house; because the consequence would be a poisoning of the subsoil.

It might be permitted to make use of such a cesspool, perhaps, at some distance from the house, such as, for instance, in a kitchen garden, situated at a lower level than the house. The difficulty is that with cesspools of this class—given the near neighbourhood of a well—the latter is liable to be polluted. These and many other things must be taken into account in judging as to the propriety of permitting a cesspool of this character to remain. The safest rule would be to abolish all such cesspools or cause them to be made watertight.

It must be understood that to build cesspools of this kind is illegal, and could only be permitted by special arrangement, and in the cases of large houses with spacious grounds, houses the drainage of which is altogether disposed of within the boundaries of the estate.

(*b*) There is another class of cesspool, built of brickwork in cement, and cemented inside in order that none of its contents shall escape. An overflow is usually provided to remove the excess of liquid, it being supposed that all the solids will remain at the bottom of the tank. Many questions arise as to whether even this better class of cesspool should be retained.

Ventilation of Cesspools.—A cesspool should never be permitted inside a house—where far too many of them are now placed—or in a courtyard near to the house, or near to the house at all. Then, again, the cesspool should be properly ventilated, and the ventilating pipe should be away from the house, such as, for instance, led up some tree. Failing any opportunity of this, the cesspool could be ventilated by a grating in the cover. The practice of ventilating the cesspool up against the house is a pernicious one, and, if allowed at all, the utmost care should be exercised to see that the ventilating pipe does not terminate near any window or chimney.

Overflow of Cesspools.—Even with a watertight and well-ventilated cesspool certain other precautions have to be taken, the chief of which is to make certain that the outfall or overflow has been dealt with in such a manner as not to prove a nuisance to anyone. This is the most difficult matter the inspector will have to decide upon. Some cesspools have their contents regularly pumped out, and thrown upon the garden land or paddock, and in this case it is possible there may be no fault to find. But when the overflow is into an open ditch near the house, or near a frequented road, the case is very different.

There is another system of treating the overflow of cesspools, viz., by taking them into ponds. This is of very common occurrence in large country houses. The least objectionable system of dealing with cesspool overflow is to cause the liquid manure to be led underground in common agricultural pipes, something after the manner of subsoil irrigation, and in many cases this will be found to answer, always provided that the question of wells, &c., has been sufficiently considered.

Objections to Cesspools.—It would be impossible to give any complete idea of the many points in respect of cesspools which the inspector ought to be cognisant of, since cesspool usage is so very varied. But he should, as a rule, object to them when they will not hold water, when they are inside a house yard, or too near the dwelling, when they are unventilated, or improperly so, and when the overflow is proved a nuisance.

Nothing, of course, can be said in favour of cesspools at all, for at the most they are makeshifts, and the first and last resorts of the unlearned house-builders. On no account should even the best regulated cesspool be made use of, unless the house drain has been disconnected from it in one of the now recognised methods, a few of which will be hereafter described under the title of 'Disconnection.'

Cesspools in Old Houses.—The greatest care should be exercised, when dealing with an old house, to ascertain the presence or absence of these cesspools. It is not an unfrequent occurrence to find as many as a dozen cesspools in the basement

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of a large house, and the custom followed out by the earliest occupants must simply have been to dig a second when the first was full, a third when that was full, and so on. Nor must it be assumed that even when the contents of such cesspools have become so hardened as to allow of one walking across that no danger could possibly arise from them. For it is only necessary to saturate their contents to bring them to the state known as the most dangerous to health.

In town houses, especially in the older portions of a town or city, old cesspools will be discovered if properly searched for, and, as long as these cesspools remain, so long will the house possess a very dangerous factor. In the west end of London, in the oldest portions, the cesspools will almost always be found in houses which have retained their old brick drains. Sometimes the cesspool will be found in the kitchen, or in the passage. Often at the

Disconnection means trapping the line of drain, it is true, but it means more than that, viz., the interposition of an open channel, with an air grating between the trap and the house. With a mere trap in front of the cesspool there is no guarantee that the foul air from the cesspool shall not pass through the trapping water of the trap and traverse the drain in order to storm the house. It is lamentable to think how very few people seem to be aware of the fact that foul air will pass through the hydraulic seal of a trap, and that disconnection is absolutely necessary.

Method of Disconnection.—The simplest form of disconnection which can be practised so as to prevent the gases of a cesspool or sewer from entering a house is shown at fig. 5. Here use is made of an ordinary ventilated syphon with a fresh air inlet, and it may be noted that the syphon without an air inlet would be useless as a disconnector unless it had an open channel laid

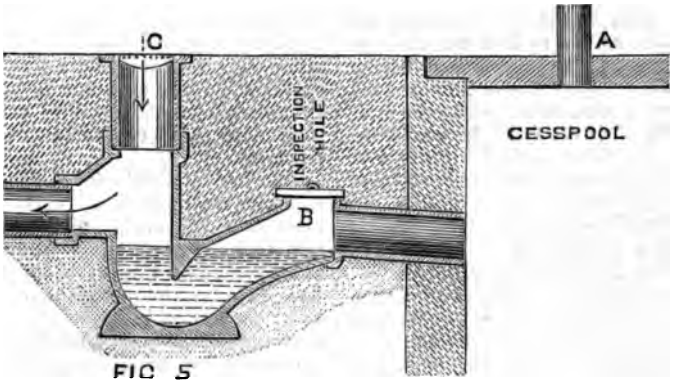

FIG. 5

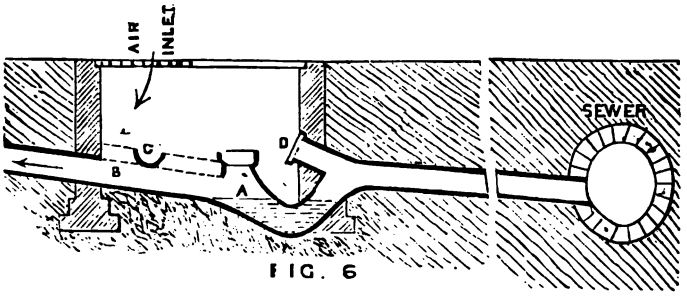

FIG. 6

most unlikely places for them they will be found to exist. There should be no hesitation as to condemning them, and insisting upon their removal. Nothing appertaining to them should be permitted to remain. Every brick which helped to form them should be carted away, and especially all foul subsoil surroundings. It is unfortunately far too frequent for builders merely to empty these cesspools when they have been discovered, filling them up with dry rubbish of all kinds, thus leaving matters very little better than at first.

§ 29. *Disconnection of Drains.*

By the term 'disconnection' is meant the abolishing of any direct communication between any waste and its outfall. In the case of a 'cesspool which has a drain leading into it from the house, no part of such drain being open to the air, then such drain is not disconnected. Neither is a house drain disconnected from the cesspool by the fact of its having a syphon trap between the cesspool and the house.

before it. A syphon trap, having an upright entry in the centre, is also useless as a means of disconnection; independently of that, it is undoubtedly the worst kind of syphon to deal with that could possibly be chosen. In fig. 5 the position of a disconnection trap in connection with the cesspool is shown, and, in order to understand the matter, it must be borne in mind that disconnection in the best sense of the term not only means the exposure of the drain for a moment on its way to the cesspool or sewer, but also means a taking-in of a current of fresh air into the drain, which shall course through it constantly and be regularly removed, by way of, for instance, a ventilated soil-pipe at a suitable height up the roof, or by a special ventilating pipe provided for this purpose. Under such conditions as are shown in the plan, where the drain delivers into a cesspool, ventilated by an air-pipe A, and disconnected by a suitably shaped syphon, such as that at B, a cesspool at a proper distance from the house would be harmless if regularly cleaned out. The

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safety of the house would be due to the fact that the fresh air intake at C is constantly renewed in the direction of the house, and the drains kept free from foul and stagnant air.

Open Channels.—Syphonal disconnection, such as given at fig. 5, is very useful in straight lines of drains of small houses, and before cesspools, but it frequently happens that a larger intake of air is necessary, and that the inlet should take the form of an open channel, which in fact becomes indispensable when there are tributary drains to be disconnected at the same time. Chambers of this sort are called 'built-up disconnection chambers' (see fig. 6), and are formed of the syphon A, the open channel B, and sometimes of the curve or curves leading into the open channel, as shown at C, the whole being surrounded with brickwork in cement. A chamber of this sort is usually covered with an iron manhole, and, where possible, this manhole takes the form of an open grating, thus providing for the fresh air intake. Where it is not desirable to take in the fresh air immediately over the grating, air can be introduced by means of a pipe led into the chamber underneath the closed cover. It is always wisest to use an iron manhole, whether it be of a closed or open pattern, for the convenience of access.

Syphons for use in disconnection chambers may take many forms, and special shapes have been devised by many engineers, all of them affording an air inlet and varying only in the length and depth of the syphon. Some of these syphons are shaped like that in fig. 5, with an inspection convenience as shown, and others are shaped similar to that drawn at fig 6 with raking entry pieces, such as indicated at D, for the convenience of pushing rods, or anything, through into the sewer and removing any obstructions.

Sewer Traps.—Several attempts have been made to provide a disconnection to open channel with fresh air inlet grating, all in one piece of earthenware, and so saving the trouble and expense of building up so much brickwork around them as would be necessitated, as in case fig 6. One of the best of these contrivances is drawn at fig. 7, and is known as

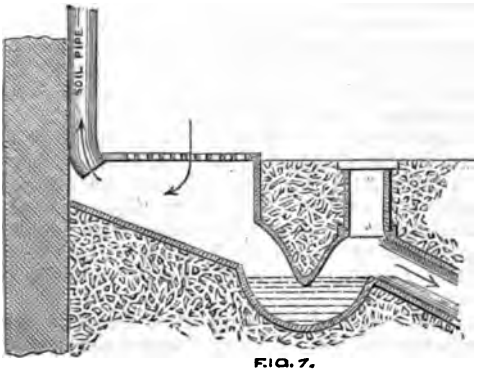

FIG. 7.

Potts's Edinburgh air-chambered sewer trap. It is made in several sizes for using in conjunction with drain-pipes of 4 inches diameter and upwards, and requires simply to be set in concrete. It is here drawn in connection with a soil-pipe. By this means not only can house drains be disconnected from cesspools, as shown at fig 5, or from the sewer, as shown at fig 6, but the house can also be disconnected from its house drain, quite close to the house wall. It has already been explained that disconnection is not achieved by means of a trap on the line of drain, unless that drain has been severed close to the trap, and the sewage visible for a moment before it passes into the trap.

At fig. 2, on p. 102, a section of a trap was shown in the vault which was meant to disconnect the house drain from the sewer and to keep out the rats: but these dip traps as they are called, are the very worst form of traps possible, inasmuch as they must perforce act as cesspools, and are otherwise objectionable.

A trap of this dangerous kind is drawn at fig. 8 on a somewhat large scale, in order to show how it must necessarily act as a cesspool, how it cannot be self-cleansing, and how very badly it compares with any of the syphons already drawn.

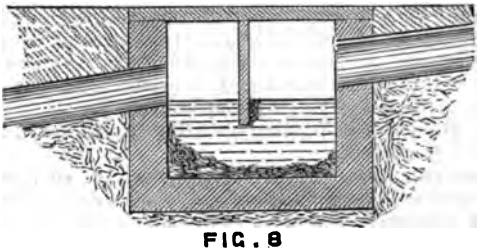

FIG. 8

Caution of as to Purpose of Disconnecting Chambers.—These remarks upon the usage of disconnection chambers would not be complete without pointing out that, however necessary and valuable such disconnection chambers are, yet there is a proper and improper use for them. They are simply intended to sever the disconnection of the soil-drain from the house, and, therefore, soil only should be taken into the air-chamber without disconnection at the foot of the pipe. The air taken in at the disconnection chamber should only be removed by the ventilated soil-pipe or by some special ventilating pipe. All other wastes, except the soil wastes, should be made to deliver in the open air before being taken into the disconnection chamber. For instance, the waste of a bath or a butler's pantry sink should not be led direct into the open channel of the disconnection chamber until after those wastes have been made to deliver over an open gulley, first of all. This double disconnection is essential.

It need not be feared for a moment that there will be any appreciable back draught in a properly built air-chamber in connection with a suitable outlet ventilator. Such a thing is hardly ever known, and, when it has occurred, the remedy has been simple and the cure abiding.

(To be continued.)

MESSRS. ROBERT BOYLE & SON, of the Holborn Viaduct, and Glasgow, inform us that in deference to the expressed wish of the bulk of the architectural profession who have used their patent self-acting air-pump ventilators for large buildings, and are desirous to adopt them for buildings of other classes, from which their price has hitherto debarred them, that they have resolved to reduce the prices of them from 15 to 25 per cent., this reduction to commence at once. This firm also add that they have been induced to make the reduction from the highly satisfactory results that ensued from a similar one made about three years since, their sales having increased to a large extent. The two reductions make the air-pump ventilators 40 per cent. less than they originally were, and practically places them within the reach of all persons requiring ventilators.

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IMPROVEMENTS IN VENTILATING SEWERS.

By G. F. Harrington, Mayor of Ryde.

Probably we shall best explain these improvements by describing, 1, the sewage and effluvia therefrom with which sewers are charged; 2, how the self-acting initial force to ventilate sewers is obtained; 3, the results obtained.

1. The sewage and effluvia therefrom with which sewers are charged.

The sewers of London and other cities and towns are charged with a mixture of runnings from stables, cow-sheds, and pig-styes; blood and offal from slaughter-houses; refuse from blood-boilers, bone-boilers, tripe-boilers, and other offensive trades; water-closet sewage from those afflicted with the many ills which flesh is heir to; and the vapours charged with zymotic diseases which decomposing sewage gives off; together with the sewer-gas which is generated in house-drains, and forced therefrom into sewers by numerous and frequent discharges of scullery-slops and water-closet sewage.

2. How the self-acting initial force to ventilate sewers is obtained.

According to the report of the borough surveyor of Ryde upon experiments which he tried on March 2, 1883, with an upcast shaft 30 feet high and 12 inches square, connected with a line of 12 inch sewer-pipes 20 feet long, terminating with a cross-section of a 12 inch sewer-pipe—total length, 50 feet. On the shaft a lobster-back cowl was fitted, with vane to cause it to revolve to face the wind; its mouth being 12 inches and its throat 8½ inches. An 8½ inch tube, 1 foot long, was connected with the shaft, respectively at 10 feet, 20 feet, and 30 feet from cowl; and each end of the 12 inch cross-section sewer-pipe terminated with a 6 inch tube 1 foot long, the areas of the two 6 inch tubes being equal to the areas of each of the other outlet tubes, and also of the inlet throat of the cowl; so that during the experiments the currents into and the currents out of the shaft, and the two currents out of the ends of the cross-section sewer-pipe, were the same in area, all the other outlets being closed. And at each experimental trial, which was continued ten minutes, two anemometers were used, and two trials, with the anemometers exchanged, were made, and the mean of the results in feet velocity per minute was as follows:—

1. At 10 feet from cowl anemometer in open air measured 529 feet-velocity; anemometer in tube measured 845½ feet-velocity; increase, 316½, equal to 59·37 per cent.

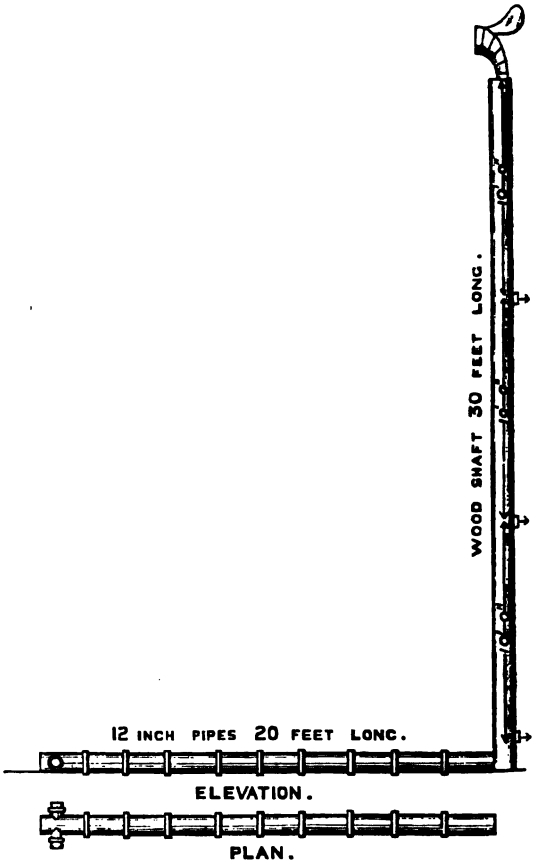
2. At 20 feet from cowl, anemometer in open air measured 582 feet-velocity; anemometer in tube measured 979½ feet-velocity; increase, 397½, equal to 68·47 per cent.

3. At 30 feet from cowl, anemometer in open air measured 632 feet-velocity; anemometer in tube measured 897½ feet-velocity; increase, 265½ feet, equal to 38·05 per cent.

4. At 50 feet from cowl, anemometer in open air measured 397 feet-velocity; anemometer in tubes measured 508½ feet-velocity; increase, 111½, equal to 31·17 per cent.

The borough surveyor, in his report, says:—'Before commencing, Mr. Harrington said it would be his crucial experiment, and predicted an increase bordering upon 50 per cent. as the average result of the four experiments tried. It actually amounted to 49·26 per cent.'

To understand how wind blowing through the cowl into the shaft should force currents thereof 49·26 per cent. stronger than currents of the wind



itself, of the same area, exerted, we must recall to mind that 'action and reaction being equal and opposite,' the *acting* force in 'incident wind' causes it to strike against and rebound from the inner surface of the cowl as 'reflected wind,' and it is the *reacting* force contained in such 'reflected wind' which meets and combines with the *acting* force contained in 'incident wind' to condense such 'reflected and incident wind' into the throat of the cowl, and thence into the inlet shaft. It is this discovery, how to obtain such increase of wind-energy, which constitutes the basis-value of the improved system; for, as the merchant requires capital to transact his business, and the mechanical engineer steam-power to do his work, so does the sanitary engineer require fresh-air-energy to ventilate his sewers.

3. The mode of applying such force to drive sewage-vapours out of sewers above the roofs of houses.

To effect this, inlet and outlet shafts are arranged, alternately, about 500 feet apart, to communicate with the sewers of a town, the inlet shafts being fitted with revolving cowls to receive and condense currents of wind; the throats of the cowls being half the area of the inlet shafts, and the cowls and shafts trapped, to prevent the return escape of the wind after it is forced through the throats of the cowls into the inlet shafts, and down them into the sewers,

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o divide into right and left currents, mix with the ewer gas they encounter, until they meet at the utlet shafts, when their reacting forces combine to npel them up the outlet shafts above roofs of houses. he patent inlet and outlet shafts will consist of ctions of wicker or basket-work, secured against uses by being pinned or bolted to nails, previously iven into their walls, and cemented inside and t side, or cemented inside with outside facings of ick-tiles, to rise, like chimneys, through the eaves, appear as ornamental integral parts of the build- s against which they will be placed.

The results obtained.

The system, by means of a temporary arrangement, s been acting on a section of a sewer, 750 feet g, in Arthur Street, Ryde, since May 12. Before as applied the inhabitants of the houses near the ver complained daily of offensive smells, and fre- ntly of zymotic diseases resulting from sewer-gas; ereas, since it has been in action, they say they re not had one whiff of sewer-gas, neither in the eet nor in their houses. This arrangement consists one inlet and two outlet shafts, each shaft being ed with a glass door to admit an anemometer, I see it measure the down or up current. On the rage the sewer is emptied of all sewer gas, and illed with fresh air, once every four or five nutes. Any one, by appointment, can see the tem in action.

Fears have been expressed that, during storms, currents in sewers will be so strong as to force wer gas through traps into houses. But this will t occur, for not only will provision be made to nfine the speed of the currents in sewers to within ny desired limit, but if a trap-rim dip one inch in ater, it will require a force equal to five pounds to he square foot to force it, and wind must blow 30 miles an hour to exert that amount of force, at which rate sewers would be emptied of sewer-gas and refilled with fresh air once every ten seconds. And, under such circumstances, the quantity of sewer-gas it would receive would be so infinitesimal as to be incapable of being detected; so that we have not only a self-acting arrangement in the cowl t prevent the sewer current being strong enough to force a trap, but, even if it were to occur, it would be harmless.

Fears have also been expressed that sewer-gas, after it has been forced above the roofs of houses, will descend again. That this will be impossible is proved by the barometer, the mercury in which falls 1-10th of an inch in ascending 103 feet. And as a square foot of mercury, 1-10th of an inch thick, weighs 115 ounces, it follows that the downward pressure of the atmosphere decreases rather more than at the rate of 1 ounce to the foot; so that at the top of a shaft 30 feet high, the downward pressure of air would be about two pounds per square foot less than at its base. And as air, at that altitude, occupies more space, and there being no cause to bring it down, it is as impossible for it to descend as it would be for lighter oil to descend through heavier water. And as carbonic acid gas, and smoke, the products of combustion, which would be unbearable and fatal in our rooms, are innocuous when they issue from chimneys; so, in like manner, sewer-gas, with disease germs, the products of sewage decomposition, which are offensive, and often fatal, in our rooms and streets, would become equally harmless when forced above the roofs of houses. And as this can now be done with certainty, efficiency, simplicity, and economy, it will amount to a sin of omission to allow filthy, disgusting, dangerous sewage effluvia, charged, as it is, with germs of typhoid, small-pox, diphtheria, &c., longer to foul the air we inspire into actual contact with the two ounces of blood-spray which the heart, at each beat—75 per minute—forces into the lungs, to impart, but too often, that blood-poisoning which is annually, in the United Kingdom, destroying tens of thousands of our fellow creatures—many in the bloom of youth and prime of life—destroying them in as untimely a manner as though slain in the battle-field.

Edward Easton & Co., sanitary engineers, Westminster, in their official report upon the new, system, say:—'In conclusion we consider that this scheme for ventilation should receive the serious consideration of all borough surveyors of towns, as from the results obtained we feel confident it will provide for the long-felt want of an efficient and simple system of sewer ventilation.'

THE SEWERAGE OF FRANKFORT.

By E. F. Willoughby.

About fifteen years since the municipality of Frankfort-on-the-Main determined on abolishing the cesspools and open gutters with which that, like most German towns, was disgraced, and on substituting a regular system of sewers. The work was entrusted to Mr. Lindley, an English engineer, domiciled in Germany, who adopted the method generally employed in this country, and known on the Continent as *tout à l'égout*, of egg-shaped brick sewers, ventilated into the streets, and receiving the whole of the rainfall as well as the sewage proper. Whatever may be the shortcomings of the system itself, they were in this case reduced to a minimum by the excellence of the workmanship and plan, as proved by the fact that periodical flushing suffices to prevent any deposit of silt in the sewers so effectually that no labourer has ever had to enter them with shovel or other implement; a strong contrast to the sewerage of London, where 150 men are constantly employed by the Metropolitan Board of Works, besides those in the service of the local authorities, in removing the solid deposits by manual labour. The sanitary results were as gratifying; the general death-rate has steadily declined from 40 to 20 or less per 1,000; typhoid, once ever present, has been reduced to an eighth of its former prevalence; and diphtheria, the scourge of other German towns, is less fatal than in those of our country.

But now a cry is heard from the spreading suburbs and the villages on the banks of the Main that the pollution of that river is becoming intolerable and calls for immediate redress, while here, as elsewhere, the question arises how to purify the sewage before admitting it into the river. The plan suggested by Mr. Lindley, and which has been accepted by the municipality, is to convey the whole of the sewage to a spot on the left bank of the Main, called Niederrad, that from the part of the city and its suburbs lying on the right side being conducted thither by a culvert beneath the bed of the river, and there to erect tanks and other buildings and appliances for clarifying it by mechanical, or, if necessary, by chemical processes, so as to render it fit for being discharged into the Main or into the contemplated navigable canal alongside of the river itself. For reasons with which we are not acquainted, the local authorities do not

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see their way to the purchase of land for the purpose of purifying it by irrigation and filtration through the soil.

The current number of the *Vierteljahrsschrift für Gesundheitspflege* contains a report of the Royal Commissioners on the scheme proposed by the municipal authorities, to which they take grave exception. While approving the choice of the left bank for any sewage works whatever, on account of the lesser number and population of the villages on that side, they would have the sewage, however treated, discharged into the old course of the river, and not into the canal, where it might exert an injurious influence on the health of the floating population.

Questions of a financial nature they acknowledge to be beyond their cognisance, and they decline to express an opinion on the probable effect of the new canal on the volume of the original stream.

But they unhesitatingly decide in favour of irrigation against any system of so-called purification. The municipality had sent their engineer to England, where he visited the towns of Leeds, Bradford, Birmingham, Coventry, and Aylesbury, forming a favourable idea of the methods at work, especially the alumino-ferric, and considered that if manufacturing towns could, with apparent safety, discharge their sewage into comparatively small streams, no ill consequences could follow the discharge of that of Frankfort into so large a river as the Main.

The Commissioners, however, maintain that nothing can be accepted as unexceptionable on sanitary grounds but a general obligatory removal of the fæcal matters in their natural condition, or a system of irrigation, *i.e.* filtration of the sewage by downward intermittent filtration, and the former, apart from its intrinsic defects, is obviously out of the question in the case of a town already provided with sewers.

They insist on the now admitted fact that mechanical filtration, so called, and subsidence in tanks remove only the barren suspended matters; that these have little or no manurial or commercial value; and that the most noxious and morbific elements of sewage are either dissolved or in a state of such fine suspension as to be irremovable by such means; and that even by chemical reagents, though putrefaction may be delayed, these are not precipitated to any considerable extent, nor, which is the most important point, are pathogenic organisms destroyed.

They predict the failure of any of the proposed schemes, and the necessity, after all the outlay, of having resort ultimately to irrigation. It does not appear that Mr. Lindley visited any of the sewage farms in England; indeed, he was sent hither with the foregone conclusion of approving one or other system of mechanico-chemical depuration of sewage. The Ministries of the Interior, of Public Works, of Agriculture, and Domains and Forests, and of Education and Public Health, in a joint communication addressed to the municipality of Frankfort, express their entire concurrence with the views of the Commissioners, and grant their sanction to the scheme of the Corporation only as a measure of immediate urgency, a provisional remedy for what they look on as justly described to be an intolerable nuisance.

We trust that the authorities of Frankfort, who have done so well in the past, will be better advised, and, like those of Berlin, secure, at whatever cost, an adequate extent of land for sewage farms while such land is still unbuilt on.

THE DISPOSAL OF HOUSE REFUSE.*

By J. P. SPENCER, C.E., Newcastle.

THE question of the disposal of house refuse having frequently come before the sanitary authorities of this country, and apparently without any unanimous conclusion having yet been arrived at, it may not be out of place briefly to review a subject which is not only important in itself, but appears always to bring out a free expression of opinion and a considerable variation of sentiment, whenever it is introduced.

Too often these discussions have been allowed to lapse into the controversy as to whether the water-carriage system of the disposal of sewage, the pail system, or some modified form of either of these was the best; but it must not be forgotten that in cases where the sewage has been disposed of in the best form of water-carriage operations, the ashes and other refuse remain still to be dealt with.

In this paper it is proposed to touch on the question of sewage disposal to a very small degree, and only as bearing upon these classes of dwellings where the present water-carriage system is found by experience to be scarcely suitable. The condemnation by sanitary reformers of the old style of ashpits or middens is now universal; but it is not so many years since it was thought the best and most approved method of disposing of refuse. Unfortunately while the workers and thinkers in sanitary science are active and anxious for the public health, the Legislature is, as usual, a long way behind. All sanitary engineers, medical officers, inspectors of nuisances, medical men generally, and all thinking and intelligent members of the community condemn the system known as the privy and ashpit; yet the Statute Book requires that such shall be provided, and there it stands.

The first step in the right direction appeared to be an effort commenced about fifteen years ago, to so construct these ashpits as to cause the ashes to fall upon the most offensive contents, and to some extent absorb the gases. This, however, was not found to be practically effective, and moreover it assumed the principle that the accumulation of refuse for many days, and even weeks, was inevitable. This must be wrong, and any mode which favours the accumulation for more than two days should be discountenanced. Nightly removal would be better, and is by no means impracticable either on the score of expense, or for any other reason.

The first suggestion of the pail system appeared to come from Rochdale, where it was at once commenced on a large scale, and has since been greatly improved and developed. Here, however, the collection of refuse is in large tubs, separate from the privy pails; and this again would seem to involve a somewhat prolonged accumulation. If so, it is a mistake, as next in importance to the immediate removal of sewage comes the daily removal of refuse.

It may by this time be inferred that the object of the author is to recommend the nightly removal of house refuse and the avoidance, at any reasonable cost, of a prolonged, or large accumulation on the premises.

Up to the present time there seems to be no better mode of accomplishing this than the pail system. This plan to be successful should be carried out in

* Paper read at the meeting of the North Eastern Sanitary Inspection Association, Carlisle; with additions.

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conjunction with efficient drainage; because if no proper gullies and drains be provided the temptation will arise, among the poorer classes, to throw slops into the pails. This would greatly detract from their usefulness and probably cause them to become a nuisance. Hence it is certain, that the present pail system is by no means perfect, but it must be acknowledged to be a great improvement.

The question whether or not the excreta should be allowed to go into the pail is open to doubt; if it be so, by far the best mode is to have only the pail, and to allow the excreta, the ashes, and other refuse to be all put into it.

This is the least offensive, the least costly, and probably the least unhealthy process. A large proportion of the gases are absorbed by the ashes and dry rubbish, and the latter also constitute a convenient vehicle in the form of which to convey the refuse away. As a rule this also prevents the pails from becoming very dirty, and a free sprinkling of deodorising powder is generally all that is required.

Where water-closets can be provided the nuisance liable to arise from the refuse pails should be really a minimum. Unfortunately, for the lowest class of dwellings, no suitable water-closet has yet been invented and, failing this, the next best thing appears to be the pail system.

A great objection is sometimes taken to the alleged nuisance caused by the vans conveying the pails through the streets: this applies chiefly to what is known as the separate pail system.

The ordinary ashpits are now generally cleaned out at night time, and no great nuisance, in a properly managed town, ever arises from the conveyance of the contents through the streets at night. The only nuisance is where the refuse heap has temporarily lain on the street, or where from neglect the ashpit has been allowed to remain too long a time without being cleaned out. This on the pail system would be abolished, and there is no valid reason, in most towns, where back lanes exist, why the contents of the pails should not be emptied into ordinary carts every night and conveyed to the depôt.

Having got the refuse to the depôt the next question is, what to do with it. In country towns the distance is not too great to have the depôt in some suburb where it cannot be a nuisance, and there it may be allowed to remain until gradually taken for light manure by farmers.

In large towns the distance is too great, and if no sale can be obtained for it, in its crude state, it should be burnt. There is now no difficulty in disposing of it in this way, as suitable destructors have been established in many towns with excellent results.

The question of cost is no doubt an important one, but the question of health is more important.

The expense evidently varies to a large extent in different districts, for instance the cost of the pail system in Bury was something like 16*s.* per pail per annum. This included cartage and every legitimate charge. It was not stated whether any special circumstances rendered the cost greater in Bury than elsewhere; but the author's experience is that in some other places the cost is not so great. In the borough of Tynemouth, for instance, the cost is only 7*s.*; in Birmingham it appears to be about 15*s.*; but in judging of the relative costs, it should be borne in mind that if water-closets were at once substituted for every pail closet in a district, the refuse would still cost a great deal for disposal in the aggregate.

In speaking of the cost as above it is only right to say that in Birmingham the pails are removed in vans and cleaned, whereas at Tynemouth they are not, and should that be done at the latter place an additional annual amount of about 4*s.* per pail would have to be added. Of course the expense must depend to some extent upon the distance from the depôt and other local circumstances in each town, but the author estimates that an average cost of 12*s.* per pail per annum, is sufficient to include daily removal, and cleansing of pails so as to prevent any nuisance.

The cost of cleansing the pails is no doubt very great; but where the excreta and the ashes are all put into the same pail, and reasonable care is taken to provide drainage and keep out slops, it will be found unnecessary to remove the pails to the depôts for cleansing, except at intervals in the poorest neighbourhoods. Where cleansing becomes after a time necessary, the author suggests that in the case of galvanised iron pails it would be better to use heat instead of water for the purpose.

A proper drying process, which could be easily devised if a destructor furnace were on the premises, would speedily destroy any injurious attachment or incrustation. In the case of wood pails a simple sluicing with a hose would be a less effectual but still perhaps a sufficient mode of cleansing. Like everything else, the pail system requires a little tact and management in the working; and this is, it may be presumed, one of the duties for which inspectors are engaged.

The first cost of construction of the pail receptacles is very small, for where the cost of a water-closet with ashpit attached would be over 20*l.*, or the cost of a privy and covered ashpit 17*l.*, the cost of a pail-closet would not exceed 10*l.* built of brick and roofed in, and including 4*s.* for the pail. This should fall upon the owner, and he should be required from time to time to renew the pail when worn out. A pail will last, however, for many years.

Like every other reform, the pail system of disposing of house refuse has, and no doubt will still have, many difficulties surrounding it. The mere fact of the gradual favour that the 'combined' pail system is gaining over the separate system, on the question of sentiment or nuisance, is a proof that it is gaining headway. The only, though vital and important, argument in favour of the water-carriage system of sewage—viz., its immediate removal from the premises, is the same which forms an important element in the pail system of refuse removal; consequently those should carefully and impartially consider the one, who consistently advocate the other.

Above all things it is to be hoped that no difficulties or expense, either temporary or permanent, will ever induce any sanitary authority to return to the unsanitary and dangerous system of fixed ashpits. No argument, and certainly no reason, can be found to justify such a course; and, whether they be constructed as privies or as ashpits only, and on some modified or even improved form, so long as the principle of them involves the accumulation and long detention of the refuse, they must be wrong. No precaution can really be taken to render them innocuous; and even if they be lined out with

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cement, which will crack; or sloped inside, which will leave a sharp furrow at the bottom for liquid refuse; or sunk into the ground, which will cause percolation; or kept above the ground, which will cause leakage upon the surface; they will surely remain offensive, less only in degree than the old unhealthy privy and ashpit which has in times past slain so many thousands.

The author, therefore, ventures to recommend all concerned to avoid any kind of fixed accumulative ashpit, whether ancient, modern, or modified in type, and to insist upon such a practice as will absolutely entail a removal every second day, and enable a convenient system of removal every day, whenever considered expedient, in consequence of infectious disease or other causes. In all cases of infectious disease the pail system is most important and by far the safest.

In the water-carriage system of sewage disposal the germs of disease are carried away through miles of pipes, having thousands of connections or inlets into houses spread over a large area. They are carried off out of sight, we know not whither, and left to be stranded, we know not where—probably to propagate infection and breed disease in diverse quarters. This danger need not occur in the pail system, because the germs of disease can be secured and destroyed at once without further chance of propagation.

The following, among others, is a good way of dealing with the danger. Immediately a case of infectious disease is reported at the Health Department, let the ordinary pail be removed from the house where the patient lies, and a pail of a distinctive colour—say bright scarlet—be put in its place. Every night it could be removed, and, it being a standing rule that every scarlet coloured pail be destroyed after being once used, the contents *and pail* would be burnt at the depôt, a new special pail being substituted each time of removal, and, in turn, burnt.

Thus, at a small extra cost of a few shillings per day, the probability of the spread of infection from this source would be obviated.

This method has been carried on for some time past at Nottingham, and has been found to be very beneficial as a precaution, and great credit is due to the Sanitary and Health Department there for having introduced and carried out such a good practical mode of checking the spread of infectious disease.

The important question of refuse disposal as well as of sewage disposal, is yet far from being fully developed, and is still in a transitional state; hence none of us can afford to be dogmatical, and these remarks are put forward expressly for the purpose of raising discussion and eliciting useful information, and not by any means with the idea of propounding a settled practice. The author, however, ventures to advance them in arrest of hasty judgment and premature condemnation of the pail system of refuse disposal; and, while he leaves, on the present occasion, the advocates of the separate system of pail closets to defend their practice, he has no hesitation in recommending the pail system for the reception and removal of house refuse, whether it be used as an ashbin only, or as a combined privy, ashes, and refuse receptacle; and if such a mode of refuse removal cannot be approved by all, it is hoped that at least until some better method is propounded, its present merits will be recognised.

THE

SANITARY RECORD.

NOVEMBER 15, 1883.

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The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

PRIVATE POWERS AND PUBLIC HEALTH.

WE have lately heard suggestions of the desirability of adopting extraordinary measures in view of the possibility of the outbreak of an epidemic among us, and some such measures might be useful; but before recourse is had to them it may be well that people should be reminded of what is the existing machinery for protecting the public health. Under the Public Health Act of 1875, the whole of England is divided into urban and rural sanitary districts, under the care of urban or rural sanitary authorities elected by the inhabitants of their respective districts. Scotland and Ireland and the Metropolis are regulated by separate Acts of Parliament, but they contain provisions similar to those of the English Public Health Act, which may therefore for our present purposes be considered as applicable to the whole of the United Kingdom. Each local authority, whether urban or rural, is bound to appoint a medical officer of health and an inspector of nuisances, and these officers are the persons who are directly charged with the administration of the law for the protection of the public health.

Their duties are to be found in various sections of the Public Health Acts, the Towns Improvement Clauses Act 1847, and in other Acts of Parliament, and have further been specified by General Orders of the Local Government Board, which were issued in March 1880. The medical officer is appointed subject to the approval of the Local Government Board, and his duties are defined to be as follows:—

1. To inform himself respecting all influences affecting, or threatening to affect, injuriously the public health within his district.

2. To inquire into and ascertain, by such means as are at his disposal, the causes, origin, and distribution of diseases within his district, and to ascertain to what extent they depend on conditions which are capable of removal or mitigation.

3. To inspect his district systematically, and as occasion may require, and so keep himself informed of the conditions injurious to health existing therein.

4 and 5. To advise his local authority on all sanitary points which affect them, and on any question relating to health involved in the forming or subsequent working of their by-laws and regulations.

6. On receipt of information of the outbreak of any contagious affections or epidemic disease within the district, to visit the spot without delay, and inquire into the circumstances, and to advise as to the measures necessary to prevent the spread of the disease and to assist in carrying them out.

7. To direct and superintend the work of the inspector of nuisances, and when informed by him of

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the existence of a nuisance injurious to health, or of a case of overcrowding a dwelling-house, to take prompt steps to have the matter remedied.

8. To inspect and take the necessary steps to secure the condemnation of unwholesome food exposed or intended for sale.

There are other regulations for his guidance contained in the same order, but the above provisions show that the medical officer of health, if he does his duty, will be well acquainted with the sanitary requirements of his district, and should be able, if properly backed up by his local authority, to keep the district fairly free from unhealthy influences. The inspector of nuisances is, as we have seen, to act under the direction of the medical officer. His duties may be summarised as being to discover and report to his superiors the existence of anything in the district which is likely to be injurious to the health of its inhabitants. He has large powers given to him of entering on private premises for the purpose of inspection, and may give notice requiring the abatement of nuisances, but he cannot in most cases take steps to enforce their abatement unless directed to do so by his superiors.

The duties of the local authorities as regards private houses are to provide a proper system of drainage, and see that all houses in their district are either properly connected with the sewers or provided with adequate cesspools; and in urban districts (and, where so required by the Local Government Board, in rural districts also) to provide a proper water supply. In case a house is reported by the surveyor or inspector of nuisances to be without a privy and ashpit, the local authority may provide them at the expense of the owner of the premises; and if a drain or cesspool, or anything of that sort, is allowed to become a dangerous nuisance, they can, in the same way, put it right; and they can also, at the owner's expense, whitewash or cleanse any house which is certified by the medical officer to be in such a filthy or unwholesome condition that the health of any person is affected thereby. In case a house, or part of a house, is so overcrowded as to be dangerous or injurious to the health of the inmates, *whether they are members of the same family or not*, the local authority can apply to magistrates for an order to abate such overcrowding; the magistrates may make such order besides imposing a penalty, and, if there are two convictions for overcrowding against the same house within three months, may close the house.

The causes which most tend to the spread of epidemic diseases are bad drainage, bad water supply, want of cleanliness, and overcrowding; and as we see the local authorities have large powers of dealing with these causes, and of correcting them if need be, the duties of the medical officers and inspectors of nuisances include looking into these matters and calling on their local authorities to take such action as may be necessary. If, therefore, the local authorities and their responsible officials do their duty, the existing law affords us adequate security. There may, however, be cases where the responsible officials are inclined to shirk their work. If they do, the local authority which has appointed them may suspend them or dismiss them from their posts. But the cases where the law is not enforced much more often can be traced to the unwillingness of the local authorities to incur odium or expense by prosecuting where infringements of the law are brought to their notice, than to the neglect of either inspector or medical officer. If the local authority makes default in doing what it ought to do, the Local Government Board can interfere, and if the default is in suppressing a nuisance, may authorise a police officer to institute any proceeding which the defaulting authority might institute in respect of such nuisance. But the Local Government Board is in ordinary times slow to interfere unless the default is a serious one, and the neglect of the local authority is likely to lead to serious consequences. In smaller matters, if local authorities refuse to move, there is practically no means of compelling them to do so; and even if new legislation were to give them greater powers, it would be difficult to make them use those powers effectually, unless they did so of their own freewill. Private individuals may, however, do much by calling the attention of inspectors of nuisances, medical officers, and the local authorities of their district, to the existence of nuisances or other unsanitary matters, to get the ill remedied. They may sometimes by themselves applying for a summons before magistrates obtain the removal or abatement of the nuisance of which they complain; or they may call the attention of the Local Government Board to the matter and so make their own local authority do its duty. It is the interest of every one to protect both himself and his neighbours by enforcing the provisions of the existing laws, and if individuals and local authorities will each try to do this, further and more stringent legislation for the protection of public health ought to be superfluous.

HYGIENE IN SCHOOLS.

JUST when we have received with hearty satisfaction the information that hygiene has been added to the science subjects recognised by the Department of Science and Art, and for the results of examinations in which grants will be made (see SANITARY RECORD of Sept. 15, p. 104), we read in the *Centralblatt für Allgemeine Gesundheitspflege* a humorous and able address on the same subject delivered by Dr. F. Scholtz, of Bremen, before the German Teachers' Association.

He recognises in the dictum of our countryman Locke, that the education of the body is of as great importance as that of the mind, the first indication of a reaction against the asceticism of the dark ages, though the protest came too soon to elicit a response, at least on the Continent. He hears the same in the cry of J. J. Rousseau, in his 'Emile.' 'Nature, nature! Away with the enervating institutions of a superfine culture. Away from the hands of men which spoil everything, into the bosom of unsophisticated nature!' For what else, he asks, is hygiene but the establishment in spite of difficulties of the conditions under which man may reach the highest physical and psychical development, the restoration of nature, so long opposed and crushed by a degenerate civilisation?

Distinguishing between theoretical and practical hygiene, or, more correctly speaking, the teaching and practice of the laws of health (*Gesundheitslehre* and *Gesundheitspflege*), he observes that in these days of sanitary activity the practical enforcement of these laws has proceeded in advance of their teaching, and, like Lord Derby, who maintained that sanitary education must precede sanitary legislation, insists on the value of instruction in such matters. Here he takes occasion to quote as a truth, though by no means the whole of the truth, the witty aphorism

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of Baron Liebig, that the actual stage of culture a people has, as a whole, attained may be estimated by their consumption of soap.

He then propounds four theses, the first of which is that hygiene should be obligatory as a subject of instruction in all primary schools. Fully admitting the justice of the complaints of overwork in schools, especially the higher, heard from all parts of Germany, he maintains that in schools for both sexes and all ranks there are subjects of far less real value to which much time is devoted, and which, if need be, should be made to give way. But the fact is, he says, that hygiene might be taught without any addition to, indeed with the creation of a livelier interest in, the present curriculum.

His second thesis is that 'hygiene should be treated as a part of natural science,' and should be felt to be and taught as the practical and, so far as regards the biological subjects, almost the only useful application of these to common life. The greater part of botany as commonly taught is utterly useless; and anatomy, as taught in German schools.*

Thus in his third thesis Dr. Scholtz maintains that the instruction in these subjects should be strictly limited to their bearing on health. Of what use, for example, is, he asks, to the children of the poor, or, indeed, to any, a knowledge of the minute structure of the lungs, the mechanism of the muscles of natural and of forced respiration; even the chemistry of inspired and expired air, if the pupil is not taught the ill effects of air vitiated by respiration or lights, the relation between respiration and ventilation; the means by which the necessary renewal of the air may be attained, and so on. Digestion and nutrition, the functions of the skin, &c., should be taught with the same practical aim, and illustrated by history, and to a certain extent by experiment. He gives a sketch of the syllabus he would propose, corresponding very nearly with that just issued by the Department of Science and Art, and adds a fourth thesis, that hygiene should be taught in the seminaries (*i.e.* training colleges) as an obligatory and integral subject, on the principle that whoever attempts to teach the elements of a study should first be master of the whole.

In an eloquent peroration he dwells on the moral aspects of hygiene as even greater than the material. Hygiene, though it may add to the enjoyments of the rich, concerns far more the poor; it is not with luxury that it has to do but with a return to nature, that nature from which nothing can be more removed than the actual condition of the lower classes of Europe, in town or in country. He insists in earnest language on the intimate relation subsisting between dirt, pauperism, and the demon drink (Brantweinteufel) as mutually acting and reacting on one another. He finds a deeper truth in the proverb that 'clothes make the man' than appears on the face of it. Self-respect depends for its existence on outward appearances as on inner worth. The dirty, ill-kept home leads to habits of drink, and the wife's part in this respect is of the utmost importance.

'Know thyself' was the wise man's saying two thousand years ago, and still we must repeat 'know thyself, thy body, its construction and functions, the conditions of its life, not merely to keep thy body in health but to preserve it as a temple fit for the soul.'

* Anatomy does not figure among the South Kensington subjects, but much that we include under physiology is rightly referred to anatomy in Germany.

NOTES OF THE MONTH.

RIVERS' POLLUTION.

PURE water in the rivers of our manufacturing districts has become rare, if not unknown; and though all are agreed that this ought not to be the case, still the owners of manufactories of all kinds continue almost as a matter of course to discharge their refuse into the nearest stream. In many cases the practice has continued so long that it cannot now be prevented, as a prescriptive right to foul the water has become established. But fresh pollutions can be stopped if proceedings are taken in time, and whenever this is done the public benefits in a negative way by saving a stream from further pollution. Too often no one interferes, and the prescriptive time for establishing the right to foul a stream is allowed to run, and we are consequently glad to be able to call attention to a case where a plaintiff has successfully objected to the fouling of a stream, even though no new point of law has been decided and the rescue of the stream is only partial.

In a case recently decided in Scotland by Sheriff Guthrie, Mr. Houston, a silk printer, whose property adjoined the North Calder river, complained, as a riparian owner, that the water coming down to him was polluted by the refuse coming from the dye works of the defendant, John Glen, which were situated higher up the stream. The defendant denied that he was polluting the stream, and further asserted that if he did it was immaterial, as others besides himself did so too. The Court decided against him on both points, and on the second pointed out that the fact that others polluted a stream too was no answer. This was decided a good many years ago by the House of Lords in the case of the St. Helen's Smelting Co. *v.* Tipping, 11 H.L.C. 642, and the same doctrine has often since been enunciated by our Courts; but those who are not lawyers seem to be ignorant of it, and to think that, when a nuisance once exists, anyone may add to it with impunity. Unfortunately, though this is not so in law, it often is so in practice, for no one thinks it his business to put the law in force. The local authorities, who have intrusted to them the duty of watching over the sanitary well-being of their respective districts, seldom try to enforce the powers given to them by the Rivers Pollution Act, 1876, and it is no doubt difficult for them to proceed under that Act, because of the numerous protections for existing nuisances which are there provided. The public must still depend for protection of such streams as remain pure on the interested action of individuals who may consider it worth their while to institute proceedings in defence of their own rights. Still in this case the preservation of private property is beneficial to the public at large; and we hope that other riparian owners will be encouraged to prevent the growth of any fresh pollutions along the banks of the streams in which they are interested.

POISONING BY DISEASED MEAT.

THE inquiry into the cause of death of Thomas Furlong, one of the twenty-eight labourers supposed to have been poisoned at Rosegarland, county Wexford, has been concluded. Mr. Leigh, J.P., the employer of the men who suffered, having been boycotted by the Land League, there was some sus-

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picion that the deceased might have been deliberately poisoned, and hence the interest with which the inquest has been watched locally. Happily the verdict sets at rest this suspicion; the evidence adduced is, however, well worthy the attention of medical men, and especially of health officers. It may be remembered that a cow, alleged to have been the subject of dry murrain, had been killed, and about 14 lbs. of it divided among the twenty-eight labourers, with some beer. Several were shortly afterwards taken ill, and among them was Furlong, who died. Others, according to the evidence given on the first day of the inquiry, felt no ill effects. The adjournment was for the purpose of obtaining an analysis. Dr. Cameron, public analyst, was examined, and deposed that he had carefully analysed a quantity of beef, salt, and beer, and a human stomach and kidneys and the portion of a liver, which he had received from the constable in charge of the case. He detected no mineral or organic poison. The stomach was congested, but not ulcerated or corroded, and the liver and kidneys were healthy. As the case was important he gave portions of the beef, salt, and beer to Mr. Macalister, F.I.C., who spent nearly a week analysing them, but failed to discover any trace of poison, mineral or organic. Dr. Cameron also stated that the meat had an offensive odour, and it was his experience that a diseased carcase, whatever the disease, was more likely to enter into a state of decomposition than the carcase of a healthy animal. Mr. Bole, inspector to the veterinary department of the Irish Privy Council, deposed that he spent the previous day in making inquiries. He questioned Mr. Leigh, the owner of the animal, the herd who had been in charge of her, and the man employed to bleed and dress the carcase, and from what they stated to him, as well as from an examination of the meat, he had come to the conclusion that the heifer on the day she was slaughtered was suffering from spelnic apoplexy. The symptoms of splenic apoplexy, in an incipient stage, and dry murrain might be confounded and frequently were. He did not doubt this mistake had been made in the present case. The flesh of an animal suffering from splenic apoplexy was not fit for human food, but the disease known as dry murrain was not held to render the meat unfit for human food. The jury found that the deceased died from eating diseased meat.

There is nothing in the evidence to show whether Furlong's illness was a form of splenic fever, or merely irritant poisoning from ingesting meat partially decomposed. From Dr. Cameron's remarks he seems to be of opinion that the disease was *not* communicated splenic fever.

AN INDUSTRIAL CITY.

HERR PAUL DEHN has written a short account of the immense iron works of Krupp, in Essen, for the *Industrie Blätter*. Krupp's works were founded in 1810; in 1855 the number of his workmen rose to 693, and soon afterwards he felt obliged to build dwellings for them. The number of his workmen in 1882 was 10,598, and the number of houses 3,208, in which live 16,200 souls. The houses are built containing from two to five rooms, the rent running from about 4*l*. to 11*l*. a year. One successful experiment was a boarding house for 200 single men, and later for 500 men, providing dinner, with meat four times a week, supper, coffee, and butter; the bread they must provide themselves. A large co-operative store, started by F. Krupp, has developed enormously, and monopolised the retail trade of the district. The sick club has existed since 1856, and in 1882 had 11,011 members, and a fund of 62,698*l*. The pensions in 1882 amounted to 2,042*l*., and the death liability to 477*l*.; some alterations will probably be made in the arrangements in accordance with the new laws. Sick clubs among the workmen's families also exist. There is a sanitary committee in the works. The works have had a fever hospital since 1872; the former was transferred to the town of Essen in 1882 for small-pox cases. A disinfection house and apparatus has also been instituted on Dittmar's plan. Baths were put up near the entrance of the works in 1874. Plans of these were exhibited at the Berlin Sanitary Exhibition, and are described in the SANITARY RECORD for June 15, 1883. In 1876 a life insurance fund was started, and has risen to 1,525 members. A high school, with twenty class rooms, and a private school with sixteen rooms are among Herr Krupp's foundations, and since 1876 five technical schools have been in existence, in which classes for women in household work, &c., are also held, which are now better attended than at first. Secondary schools, both in Essen and Altendorf, near to, are supported by the firm. Work for disabled men and invalids has been instituted since 1876, such as broom making for the co-operative stores, basket making, &c., in which widows and children are employed. In one week in September 1882, the number of people—men, women, and children—connected with, and dependent on, Krupp's works was 65,381.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

AT a meeting of the council of the above Association, held on Sept. 15, 1883, the following gentlemen were elected honorary members:—Sir Robert Rawlinson, C.B., C.E., Edwin Chadwick, C.B., Dr. W. B. Richardson, F.R.S., Dr. W. Collingridge, M.A., Prof. W. H. Corfield, M.A., Dr. J. W. Tripe, E. C. Robins, F.R.S., B.A., and S.A., Baldwin Latham, M. Inst., E.C., and W. Eassie, C.E.

THE HYGIENIC EXHIBITION IN BERLIN.

THE financial results of the Berlin Hygienic Exhibition have been satisfactory. Since the opening nearly a million people have visited it, and the admissions to the gardens number 409,336. The receipts amount to upwards of half a million of marks, and the guarantee fund has been left untouched, but the contribution of the Berlin Municipality to the expenses can only be repaid in part. It is reported that the Prussian Ministry proposed to confer new rewards upon some of those who have been principally concerned in organising and managing the exhibition, but that Prince Bismarck declined to accede to the suggestion.

A NEW WAY WITH ADULTERATORS.

ON Friday, Sept. 14, Health Commissioner Raymond invited all the milk dealers of Brooklyn to meet in the Common Council Chamber, when Dr. Bartley explained to them the various tests by which they can determine whether the milk they purchase is of the required standard. After this conference the licences of such dealers as are detected in selling adulterated milk will be peremptorily revoked.

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WORKMEN'S DWELLINGS IN PLYMOUTH.

ABOUT a couple of years since the Plymouth Workmen's Dwellings Company started the erection of their first block of model dwellings on a site abutting on Sutton Road; the fourth and last block have now been completed, and the colony of ninety-six families of artisans and labourers fully established in their cleanly, convenient, and healthy homes. Each block is a solid rectangular building of limestone, with brick dressings, and the four sets form two parallel streets facing in opposite directions. Though the blocks are not all of the same size, their general arrangement is similar, and a description of one will be a description of the whole. The buildings are divided into four storeys, and each storey into sets of apartments, consisting of two or three rooms to suit the size or pockets of the family who may become their occupants. There are no means of egress at the back of the blocks, and each 'home,' whether comprised of two or three rooms, communicates by a single door only to a balcony which runs along the outside. When this door is closed, all communication with the set of rooms to which it forms the entrance is cut off, and the occupants are thus able to realise the privileges and advantages of a separate dwelling far more completely than in an ordinary house let out in tenements. Each dwelling includes a living-room, 14 feet by 15 feet, fitted with a cooking-stove, a large cupboard, and a receptacle for coal. The bedrooms average 10 feet by 11 feet, and in the centre of every room is a brick ventilator 12 inches square. All the interior walls of the building are of brick, plastered in each room to the height of 7 feet with Portland cement, and above that with cement of a commoner quality. Each storey is reached by a staircase built in a recess, both staircases and galleries being constructed of Caithness stone. But it is in the sanitary appliances and arrangements that the advantages of these dwellings are said to be conspicuous over the crowded and unhealthy surroundings of the slums and back streets of Plymouth. In the centre of each storey is an open space about 12 feet by 20 feet, which is intended for clothes-drying and similar purposes. Contiguous to each of these spaces are two water-closets and a large wash-house. The latter is fitted with trays, a furnace with water laid on above, and a pipe to carry off the waste water. In addition, there is a large metal shoot, through which ashes and house refuse may be thrown from each story to a bin underground, which will be regularly emptied. Each block has been completed before another was commenced, and the apartments have been let as soon as they have been fit for occupation.

THE ECONOMICS OF SANITATION.

IN an article in the *Bulletin de l'Académie de Médicine*, entitled 'Le Bilan Economique de la Fièvre Typhoide,' M. Rochard, in earnest and glowing language, refutes the arguments of those who maintained that the thorough sanitary reform of Paris would involve an enormous and intolerable expense, by showing, as Mr. Chadwick did at the Congress of 1878, that there is no falser economy than that which is carried out at the expense of human life and health, and that money spent in sanitary work is, in fact, financially productive.

In 1882 typhoid fever caused in Paris alone 3,276 deaths, or 1,156 more than in 1881. Of these 1,442 died in the hospitals and 1,827 at their houses. The 9,361 cases treated in hospital for 240,083 days, at 3·10 francs per day, cost 744,257 francs, to which must be added 563,660 days of work lost during illness and convalescence at 2 francs per day, a low estimate, making a total of 1,871,570 francs. The deaths at home represented probably 11,830 cases of sickness, and a loss of earnings of 2,360,157 francs, which, taken with the former, gives a loss of 4,231,727 francs. Estimating at 6,000 francs only each of the lives sacrificed, and adding the product of 19,656,000 to the preceding, M. Rochard arrives at a grand total of not less than 23,887,727 francs as the loss inflicted by the epidemic of typhoid within the year.

If this sum had been laid out in sanitary improvement, and should merely reduce the general mortality to what it was ten years ago, an annual saving of 67 million francs would have been effected; a loan of 600 millions would be a good bargain, and one of 330 millions would be practically invested at 10 per cent.

He then proceeds to indicate the nature of the improvements most urgently called for, viz. the erection of workmen's dwellings in the suburbs, a better water supply, an improved system of sewerage, and the removal of unhealthy manufactures from the city to the outlying district.

THE CULTIVATION OF MUSHROOMS.

MR. JOHN WRIGHT, of the *Journal of Horticulture*, has written a pamphlet to encourage the out-of-door cultivation of this favourite fungus. He shows that it is an easy as well as a profitable undertaking, one person in the neighbourhood of London having for seven years made a good living by his mushrooms alone. In 1881 he sent two tons of them—all grown out of doors—to market; and, notwithstanding the severity of the winter, only missed picking for one week. They cost about 4*d.* per lb. to produce, but none of these two tons were sold at less than 1*s.* 6*d.* per lb. The system pursued near London for many years has found imitation at Clubmore, only a mile or two outside the city boundaries of Liverpool. The experiment deserves to be tried widely. There is no good reason why the public should be so largely dependent on the importation of mushrooms from the Continent, or have to pay for them as luxuries, when, by our market gardeners going the right way to work, they may be produced quite as easily as early strawberries and similar products.

COMPARATIVE VALUE OF MILKS.

DR. HUSSON of Toul has been discussing the relative value of cows', goats', and asses' milk in the artificial feeding of infants, and noting the fact that while asses' milk seems little inferior to mothers', cows' milk is the least suited for the purpose, finds the explanation in the proportion in which the two proteid constituents, casein and albumen, exist in each; albumen, being far less easily coagulated, and not at all by the digestive ferment, is more completely converted into peptone than is casein. For every 100 parts of albumen there are, according to him, 122 only of casein in mothers' milk, 173 in goats', and 239 in cows'.

Other authorities give very different figures, though preserving the same order, and placing asses' milk between the human and that of the goat. He insists

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on the need of a renewed study of the composition of human milk, our present analysis being deduced from 'thimblefulls' of the secretion taken at any time, regardless of the well-known difference between what dairymen call 'fore milk' and 'strippings,' both as regards fat and albuminoids. He quotes Tarnier and Parrot as to the greatly reduced mortality in infant asylums which followed the use of asses' milk for the first six or eight weeks of life, the period during which cows' milk is so ill assimilated.

[The great discrepancy between the estimates of Husson and others is explained by their respective ideas of what constitutes casein; the real fact being that great part of the nitrogenous matter of women's, mares', and asses' milk is in an intermediate state, as shown by its not being precipitated by acid as it is in the milk of the cow and the goat. It is in its physical properties rather than in its chemical composition that asses' milk approaches human.]

BUILDING IN NEW YORK.

BUILDING in New York is progressing at a very astonishing rate. The table below, furnished by the Building Bureau of that city, presents a close approximate estimate of building operations in the last fifteen years. There are no returns drawn up of the number of new buildings or alterations for the first four years. The total tabulated estimated cost in those years slightly exceeded that of the years 1879 to 1882 inclusive; but in the former period labour and materials were higher, consequently less building was carried out. It is to be borne in mind that a certain percentage of permits are not at once acted on, undertakings being postponed from one year to another from various causes. This was the case in 1882, due to apprehended strikes and advancing cost of materials.

Estimated Cost of Buildings proposed to be Erected and Altered, from 1868 to 1882.

Year.	No. of New Buildings.	Cost of New Buildings.	No. of Alterations.	Cost of Alterations.	Totals.
		Dollars.		Dollars.	
1868.....	....	34,517,682	....	2,168,045	36,685,727
1869.....	....	40,382,058	....	4,228,174	44,580,232
1870.....	....	34,668,998	....	2,816,234	37,485,232
1871.....	....	42,185,391	....	4,351,981	46,937,372
1872.....	1,728	27,884,870	1,318	2,788,379	36,673,249
1873.....	1,311	24,936,535	1,311	3,496,995	28,433,530
1874.....	1,388	16,607,417	1,429	3,532,147	20,199,564
1875.....	1,406	18,226,870	1,258	3,200,438	21,427,308
1876.....	1,379	15,903,880	1,177	3,635,478	19,539,358
1877.....	1,432	13,365,114	1,303	3,215,125	16,588,239
1878.....	1,672	15,219,680	1,209	2,621,046	17,840,726
1879.....	2,065	22,567,322	1,373	3,300,110	25,867,432
1880.....	2,252	29,115,335	1,352	3,862,111	32,977,446
1881.....	2,682	43,391,300	1,497	4,142,070	47,533,370
1882.....	2,577	44,793,106	1,091	4,267,181	49,060,367
Totals....	19,892	424,195,638	14,923	51,625,514	475,821,152

POPULATION STATISTICS IN SCANDINAVIA.

A CURIOUS and interesting paper was lately read before the Statistical Society of Paris by Dr. Broch, formerly a Norwegian official of State, on the movement of population in the Scandinavian peninsula, in which he showed that there had been a considerable increase in Norway, owing to the great excess of births over deaths. As is well known, emigration has been for many years largely carried on in Norway, and it may be said that the United States has absorbed a tenth of the population, and yet, in the face of this cause of depletion, Norway increases her inhabitants almost faster than any other country. The number of births in Norway and Sweden, in proportion to the population, is 31·5 per cent., while in France it is only 25·6 per cent.; and while in Norway there are 263 legitimate births to every 1,000 women, France can only show 174. On the other hand, in Norway there are 31 illegitimate children to every 1,000 women, while France can show 33. The average rates of mortality during a decennial period are thus given:—Norway, 17·5 per cent. of the population; Sweden, 19·4; Denmark, 19; France, 22·5; Belgium, 22·7; Prussia, 26·1. The subsequent discussion, which turned upon the stationary condition of the French population, was wound up with a resolution that the Minister of the Interior should be requested to establish a hygienic department, with the special view of taking under its cognisance the large number of children in France placed out to nurse or abandoned altogether, and that a report should be laid before the Chamber each year on the infant mortality and hygiene, the particulars of which it would be the province of this department to obtain.

THE CONSUMPTION OF UNSOUND ANIMALS.

AN incident very similar to one reported in the SANITARY RECORD of Sept. 15, p. 124, and at page 256, recently happened at Kloten, in Canton Zurich. A butcher killed a diseased calf and sold the flesh, and ninety persons who ate of it have fallen ill. Five of them are not expected to recover. Two goats that drank from a stream into which some broth made from the infected veal was thrown also became ill, and one has since died. The butcher has been arrested, and the local authorities are inquiring into the matter.

'PEPPER DUST.'

NOT long since at the weekly spice sales in Mincing Lane, 608 bags (30 tons) of black pepper dust were sold to a single firm of brokers in two lots at 2*d.* and 1⅞*d.* per lb. respectively, the very worst pepper in the market being worth 4¾*d.* per lb., and this in the face of a protest from Messrs. W. and D. Harvest who had procured an analysis which showed the 'dust' to be composed of sand and clay 44·2 per cent., leaves, husks, &c., mouldy and unsound, 54·8 per cent., and whole grains of pepper 1 per cent. When the question of the sale was put to the 'room' only three hands were held up against it, and Mr. Harvest was threatened with legal proceedings for his disinterested interference. Where are the sanitary authorities?

NEW SYSTEM OF DRYING WALLS, AND DISINFECTING.

HERR STANISLAUS VON KOSINSKI, of Warsaw, has (according to the *Builder*) patented an apparatus for the above purpose. It is in two parts: first, an air-heating chamber, which can be transported upon wheels, like a portable engine, and is placed in the room which is to be dried or disinfected; and, second, a ventilator, which is placed outside the room, and is connected with the air-heating appliance by means of pipes, which are carried through suitably-arranged openings in the door or window. The air thus obtained is introduced from beneath into the chamber, where it is heated on heating surfaces, about

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108 square feet in extent. It is then directed by means of a radiating pipe upon the wall or other object to be subjected to its influence. The siccative effects of the appliance act in three ways. 1. In the mechanical renewal of the air at the rate of about 1,000 cubic feet per minute. 2. In the action of the radiating warmth of the heating appliance. 3. In the relative dilution of the air.

In addition to the rapid extraction of large quantities of moisture by the use of this apparatus, it is remarked that the temperature of the air, being easily brought by it to 66° F., its powerful disinfectant action is evident. The inventor has applied it to the arrangement of large disinfecting chambers in which the rapidity with which the air passes through the objects to be treated combines with the high temperature in bringing about the desired result.

By means of this appliance the rapid warming of buildings, churches, barracks, &c., can be effected, as well as the removal of vapour and moisture which may have accumulated in crowded rooms. The *Deutsche Bauzeitung* refers to its utility in many matters connected with building, and records several facts in connection with its employment at Warsaw. The building of a picture gallery was commenced in the autumn of 1881, and the edifice was ready for use in Jan. 1882. This result, it is asserted, could only have been attained by the use of such an apparatus as has been described. The picture-gallery contained rooms measuring 100,000 cubic feet. Experiments carried out in Warsaw under the inspection of an official commission showed that in a private house, the building of which was commenced in May 1882, rooms measuring more than 7,000 cubic feet on the ground-floor and first story were completely dried in fourteen days by means of this system. After a sanitary inspection had been held, these rooms were declared ready for habitation on Oct. 1, at which time workmen were still engaged upon the upper rooms and the roof.

AVENUES AND BOULEVARDS IN AMERICA.

Our American Cousins, a new periodical published in London, writes on this subject:—The municipalities accept it as part of their duties to adorn and beautify the thoroughfares of the localities over which they have control. The result is that avenues and boulevards are everywhere constructed out of the public funds. Even Brooklyn and New York, which are probably the most ill-governed cities in the American Union, are supplied with abundant trees. When a new city is laid out, attention is at once bestowed on those features of urban life which will make it an agreeable abode for all who settle in it. It is a practice in some communities, as in Rochester, to remit part of the taxes if owners of property plant trees along the front of their premises. So much has been done, and is yet being done, towards beautifying the outlying parts of Chicago, that many miles of the loveliest boulevards in the world have already been constructed, while plans have been formed for connecting the whole of the public parks surrounding the city in such a manner that no fewer than forty-eight miles of magnificent drives will eventually come into the possession of the people. New Haven in Connecticut, known as the Elm City, is so amply blessed with verdure that the view of the place from East Rock gives one the impression of a town planted in a forest. The same impression is produced when looking down upon the city of Rochester from Power's Block. Cleveland and Detroit are also reputed for comeliness and verdure. Euclid Avenue in the former city, would certainly be difficult to surpass. To my fancy, however, there is no prettier town in either Europe or America than Milwaukee. Its charming drives, its shady walks, its lawns and flower gardens, none of them inclosed, make it possible to imagine that one is strolling through a public park instead of threading the streets of a thriving and industrious community.

ON COPPER AND LEAD IN FOOD.

M. ARMAND GAUTIER has recently laid before the Paris Academy of Medicine a book with the above title, which reproduces and develops the personal researches made by him from 1878, and successively published, on the causes and the mechanism of the absorption of, the real influence and the prophylaxis of the effects of, the two noxious metals which are now to be met with in every combination. Three metals, as a matter of fact, are constantly used in the actual conditions of human life—iron, copper, and lead. Of these three substances iron yields only inert compounds, useful or indispensable to the animal economy, of which it forms an integral and necessary part. Iron and lead, on the other hand, give especial combinations which are poisonous or at least injurious in repeated doses. In consequence of their continual relations to their voluntary or involuntary introduction into our drinks, our foods, our bodies, they are almost constantly found at the present time in the blood and in the majority of the tissues. It becomes a question of what mechanism and under what circumstances these metals are introduced into the organs, and what part they play when they are thus absorbed in small repeated doses; likewise, how they are eliminated, and by what methods they may be recovered when they only exist but in very small quantities in our foods, our clothing, and our excretions. These questions are treated by M. Gautier in a series of papers, which have been collected and completed in the volume under consideration. When these researches were commenced, the opinion which was formed of the influence that might be exercised upon the animal economy by indeterminate but always small quantities of these two poisonous metals were only founded on insufficient or doubtful documentary evidence. Even the existence of copper and lead in our food, drink, and clothing have been doubted. These researches, however, based on dosages and multiplied experiments, have contributed—on the one hand, to destroy ill-founded apprehensions; and on the other, to fix attention on real dangers not sufficiently considered, such as the introduction of lead in our daily nourishment, and on its presence (now thoroughly demonstrated) in the majority of our organs. M. Gautier believes that the multiplicity of accidents affirmed to be due to copper according to unverified statistics and many judicial sentences, and the consequent danger from its introduction into our daily food, do not constitute a public danger. In this respect he is in entire accord with Dr. Galippe, who has studied this question and has experimentally shown its worthlessness. It is true, he says, that we daily absorb lead in small quantity, and this metal is quite as poisonous

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as has been represented. The daily and indefinite absorption of lead in food especially constitutes a permanent danger to public health.

THE PUBLIC HEALTH

DURING SEPTEMBER AND OCTOBER 1883.

THE mean temperature during last month at the Royal Observatory, Greenwich, was 56°·8; it was 0°·3 above the average September temperature in one hundred years, and higher than that recorded in the corresponding month of either of the two preceding years. An excess of temperature prevailed on fourteen days of the month, while on each of the other sixteen days it was below the average. The warmest day of the month was the 19th, when the mean was 62°·1, and showed an excess of 5°·3; the coldest day was the 30th, when the mean was only 48°·3, and was 6°·6 below the average. Rain was measured at Greenwich on seventeen days during the month, to the aggregate amount of 3·8 inches, which was 1·4 inches above the average September rainfall in sixty-one years. During the first nine months of this year the rainfall amounted to 16·7 inches, which was 1·5 inches below the average rainfall in the same period of sixty-one years. The sun was above the horizon during 376·9 hours during September, and 116·1 hours of bright sunshine were recorded at Greenwich; this amount slightly exceeded the average in the corresponding months of the five years 1878-82. South-westerly winds prevailed during the first and last weeks of the month. The recorded amount of ozone showed a considerable excess during the first few days of the month, but the amount subsequently measured was below the average.

In the twenty-eight large English towns now dealt with in the Registrar-General's Weekly Return, which have an estimated population of more than eight and a half millions of persons, 22,039 births and 12,878 deaths were registered during the four weeks ending the 29th ult. The annual birth-rate, which in the five preceding months had steadily declined from 36·0 to 33·3, was again 33·3 during September, and was 1·7 per 1,000 below that which prevailed in the corresponding period of last year. The lowest birth-rates in these twenty-eight towns last month were 26·3 in Brighton, 27·0 in Bradford, and 28·6 in Halifax; in the other towns the rates ranged upwards to 39·6 in Nottingham, 42·9 in Cardiff, and 44·2 in Sunderland. In London the birth-rate was only 32·3 per 1,000, whereas in the twenty-seven provincial towns it averaged 34·2.

The annual death-rate in the twenty-eight towns, which in the two preceding months had been 20·7 and 19·5, was again 19·5 during the four weeks of September, and 0·8 below that which prevailed in these towns in September 1882. The lowest annual rate of mortality last month in the twenty-eight towns was 14·6 in Derby. The rates in the other towns, ranged in order from the lowest, were as follow:—Bristol, 15·8; London, 16·7; Bradford, 17·1; Leicester, 17·3; Oldham, 17·4; Halifax, 18·1; Birkenhead, 18·4; Nottingham, 19·2; Huddersfield, 19·7; Cardiff, 19·8; Portsmouth, 20·0; Hull, 20·6; Wolverhampton, 21·2; Norwich, 21·7; Sheffield, 22·1; Birmingham, 22·4; Salford, 22·4; Leeds, 22·9; Bolton, 22·9; Blackburn, 23·1; Plymouth, 23·5; Brighton, 23·8; Liverpool, 24·8; Preston, 25·3; Sunderland, 25·7; Manchester, 25·8; and the highest rate during the month, 28·2 in Newcastle-upon-Tyne. While the death-rate in London during September did not exceed 16·7, it averaged as much as 21·9 in the twenty-seven provincial towns. The 12,878 deaths from all causes in the twenty-eight towns during the four weeks of September included 1,323 which were referred to diarrhœa, 423 to scarlet fever, 270 to 'fever' (principally enteric), 220 to whooping-cough, 187 to measles, 106 to diphtheria, and 50 to small-pox. In all, 2,579, or 2·0 per cent. of the total deaths resulted from these principal zymotic diseases, equal to an annual rate of 3·9 per 1,000. This zymotic rate, notwithstanding the slightly increased fatality of diarrhœa, showed a further decline from the rates recorded in the two preceding months, though it exceeded the rate from the same diseases in these towns in the corresponding period of 1881 and 1882, when it was 3·0 and 3·7 per 1,000 respectively. The death-rate in London from the principal zymotic diseases during September was equal to 2·8 per 1,000, and as much as 2·1 below the average rate in the twenty-seven provincial towns, among which it ranged from 1·9 in Bristol and in Birkenhead, to 6·8 in Newcastle-upon-Tyne, 8·0 in Brighton, and 8·6 in Preston. Measles caused the high zymotic death-rate in Newcastle-upon-Tyne, and diarrhœa in Brighton and Preston.

As in the two preceding months, diarrhœa was by far the most fatal zymotic disease in the twenty-eight large towns during September. The annual death-rate from this disease in these towns, which in the two preceding months had been 2·4 and 1·9, was 2·0 during September, and slightly exceeded the rate recorded in the corresponding month of last year, which was 1·8 per 1,000. The diarrhœa death-rate ranged in the several towns from 0·9 in London and in Halifax, to 5·3 in Brighton and in Bolton, and 7·0 in Preston. While the diarrhœa rate did not exceed, as above stated, 0·8 per 1,000 in London, it averaged as much as 3·0 in the twenty-seven provincial towns. The rate of mortality from scarlet fever, which had risen in the five preceding months from 0·36 to 0·64 per 1,000, was again 0·64 during September. In the corresponding periods of 1881 and 1882 the scarlet fever death-rates in these towns were 0·84 and 0·59 respectively. No death was referred last month to this disease in Portsmouth, Norwich, Wolverhampton, Sunderland, and in four smaller towns. The scarlet fever death-rate in the other towns ranged upwards to 1·1 in Sheffield, 1·2 in Birmingham, and 2·4 in Leeds. The rate of mortality from 'fever' (principally enteric), which had been 0·23, 0·25, and 0·31 in the three preceding months, further rose to 0·41 during September. In London the death-rate from fever was 0·36, and in the twenty-seven provincial towns it averaged 0·45 per 1,000, and was equal to 0·8 in Salford and in Sheffield, and 1·0 in Halifax. The death-rate from whooping-cough, which had been 0·39 and 0·46 in the corresponding months of 1881 and 1882, was 0·33 last month, and showed a slight increase upon the declining rates in recent months; in London the rate of mortality from this disease was equal to 0·35, and slightly exceeded the average rate in the twenty-seven provincial towns, among which it was equal to 0·9 in Newcastle-upon-Tyne, and 1·1 in Brighton. The annual death-rate from measles, which in the three previous months had been 0·72, 0·71, and 0·66, declined last month to 0·28, a lower rate than has been recorded in any month since February last. In London the death-rate from this disease was 0·25 per 1,000, while in the provincial towns it averaged 0·31, and was equal to 1·4 in Brighton, and 2·9 in Newcastle-upon-Tyne. The rate of mortality from diphtheria was 0·16, and showed a slight increase upon that recorded in the two preceding months; the rate in London was more than treble that recorded in the aggregate of the twenty-seven provincial towns. During the four weeks of September 50 fatal cases of small-pox were registered in the twenty-eight towns; of these 32 were returned in Birmingham, 10 in Sunderland, 6 in London, 1 in Liverpool, and 1 in Hull. During the last three months no fewer than 54 deaths from small-pox have been recorded in Birmingham. Judged by the returns of the Metropolitan Asylum Hospitals, the prevalence of small-pox in London showed a further slight increase; the number of small-pox patients under treatment in these hospitals, which had been 55 and 57 in the two preceding months, further rose to 60 at the end of September. The average weekly number of new cases admitted to these hospitals, which had been 6 and 10 in the two previous months, was 9 during September.

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The rate of infant mortality in the twenty-eight towns, measured by the proportion of deaths under one year of age to births registered, was equal to 185 per 1,000 during September, which exceeded that recorded in the corresponding periods of 1881 and 1882, when it was 125 and 172 per 1,000 respectively. In London, owing to the decreased fatality of diarrhœa, the proportion of infant mortality was only 138 per 1,000, whereas in the twenty-seven provincial towns, in which the diarrhœa death-rate showed an increase, it averaged as much as 232 per 1,000, and considerably exceeded that returned in either of the two preceding months. While the rate of infant mortality last month did not exceed 133 and 143 in Halifax and Oldham, it was equal to 254 in Birmingham, 262 in Preston, and 366 in Brighton.

The death-rate from diseases of the respiratory organs, judged by the Metropolitan returns, was below that recorded in the corresponding period of 1882. The average weekly number of deaths referred to these diseases in London during September was 157, and the annual death-rate was equal to 2·7 per 1,000, against 2·2 and 3·1 in the corresponding periods of 1881 and 1882. In Liverpool last month the annual death-rate from these diseases was 3·5 per 1,000.

The causes of 309 of the deaths in the twenty-eight towns during the four weeks of September were not certified, either by a registered medical practitioner, or by a coroner. These uncertified deaths were equal to 2·4 per cent. of the total deaths, which corresponded with the rate in the same period of 1882. In London the proportion of uncertified deaths was only 1·0 per cent., whereas it averaged 3·3 in the twenty-seven provincial towns; all the causes of deaths were duly certified in Derby throughout the month, and but one was uncertified in Plymouth and Nottingham; whereas the proportion of uncertified deaths was equal to 7·0 in Huddersfield, 7·9 in Wolverhampton, and 11·4 in Halifax.

Among the population living in the outer ring of suburban districts around London, estimated at rather more than a million persons, the annual death-rate from all causes was equal to 15·5 per 1,000 during September, against 13·2 and 16·0 in the corresponding periods of 1881 and 1882. The annual death-rate from the principal zymotic diseases in these suburban districts, which had been 3·4 and 3·0 in the two preceding months, further declined to 2·3 in September. During the four weeks ending the 29th ult., 80 fatal cases of diarrhœa, 39 of scarlet fever, 24 of whooping-cough, 13 of measles, 13 of diphtheria, 13 of 'fever' (principally enteric), and not one of small-pox, were recorded in the outer ring. The fatality of each of these diseases, excepting that of scarlet fever, showed a decline. Thirteen fatal cases of scarlet fever, 13 of whooping-cough, 4 of measles, and 4 of 'fever' were recorded in the district of West Ham. Three deaths from diphtheria were registered in Tottenham, and four from scarlet fever in Epsom sub-districts.

The mean temperature during October at the Royal Observatory, Greenwich, was 50°·4. It exceeded by 0°·8 the average October temperature in one hundred years, but was slightly below that recorded in the corresponding month of 1882. An excess of temperature prevailed on fifteen days of the month, while it was below the average on each of the other sixteen days. The warmest day of the month was the 25th, when the mean was 58°·1, and as much as 9°·0 above the average; the coldest day was the 22nd, when the mean was only 43°·0, and 7°·1 below the average. Rain was measured at Greenwich on fourteen days during the month to the aggregate amount of 1·6 inches, which was 1·2 inches below the average October rainfall in sixty-one years. The rainfall during the first ten months of this year amounted to 18·3 inches, which was nearly 3 inches below the average rainfall in the same period of sixty-one years. The sun was above the horizon during 328·7 hours in October, and 69·9 hours of bright sunshine were recorded at Greenwich: this amount was slightly below the average in the corresponding month of the five preceding years 1878–82. South-westerly winds prevailed throughout the greater part of the month. The recorded amount of ozone was considerably below the average of recent corresponding periods; an excess prevailed, however, from the 14th to the 19th of the month.

In the twenty-eight large English towns now dealt with in the Registrar-General's weekly return, which have an estimated population of more than eight and a half millions of persons, 28,189 births and 16,287 deaths were registered during the five weeks ending Nov. 3. The annual birth-rate, which had been 33·3 in each of the two preceding months, rose during October to 34·1, and almost corresponded with the rate that prevailed in the same period of last year. The lowest birth-rates last month in these twenty-eight towns were 26·6 in Halifax and in Bradford, and 27·4 in Brighton; the rates ranged upwards in the other towns to 38·7 in Portsmouth, 42·0 in Blackburn, and 42·4 in Sunderland. In London the birth-rate was 33·3 per 1,000, and in the twenty-seven provincial towns it averaged 34·9.

The annual death-rate in these twenty-eight towns, which in each of the two preceding months had been 19·5 per 1,000, was 19·7 during the five weeks of October, and 1·2 per 1,000 below that recorded in these towns in the corresponding month of 1882. The lowest annual rate of mortality last month in the twenty-eight towns was 14·7 in Portsmouth. The rates in the other towns, ranged in order from the lowest, were as follow:—Norwich, 15·3; Halifax, 15·6; Leicester, 16·0; Derby, 16·2; Bristol, 17·0; Brighton, 17·4; Huddersfield, 17·5; Plymouth, 17·7; Birmingham, 18·0; Sheffield, 18·1; Bradford, 18·2; London, 18·4; Oldham, 18·7; Birkenhead, 19·2; Wolverhampton, 19·7; Sunderland, 19·9; Nottingham, 20·3; Hull, 21·1; Cardiff, 21·4; Bolton, 21·7; Blackburn, 22·5; Liverpool, 23·5; Leeds, 24·6; Preston, 24·9; Salford, 26·2; Manchester, 26·7; and the highest rate during the month 27·3 in Newcastle-upon-Tyne. In London the death-rate during October did not exceed 18·4 per 1,000, while in the twenty-seven provincial towns it averaged 20·8. The 16,287 deaths from all causes in the twenty-eight towns during the five weeks of October included 680 which resulted from diarrhœa, 620 from scarlet fever, 305 from 'fever' (principally enteric), 267 from measles, 212 from whooping-cough, 151 from diphtheria, and 40 from small-pox. Thus 2,280, or 14·0 per cent. of the total deaths, were referred to these principal zymotic diseases, equal to an annual rate of 2·8 per 1,000. This zymotic rate in the twenty-eight towns last month, owing to the decreased fatality of summer diarrhœa, showed a marked decline from the rate in the preceding month, and was below the rate from the same diseases in these towns in the corresponding period of 1881 and 1882. In London the death-rate during October from the principal zymotic diseases was equal to an annual rate of 2·4 per 1,000, and was 0·6 below the average in the twenty-seven provincial towns, among which it ranged from 0·9 in both Norwich and Bristol, to 4·7 in Newcastle-upon-Tyne, 5·1 in Leeds, and 6·9 in Preston. Measles caused the high zymotic rate in Newcastle-upon-Tyne, scarlet fever in Leeds, and diarrhœa in Preston.

Diarrhœa was the most fatal zymotic disease in the twenty-eight towns in October. The annual death-rate from this disease, which in the three preceding months had been 2·4, 1·9, and 2·0 per 1,000, declined to 0·8 during October, which, however, slightly exceeded the rate from this disease recorded in these towns in the corresponding period of 1882. The highest death-rates from diarrhœa last month were 2·0 in Wolverhampton, 2·1 in Blackburn, and 4·6 in Preston. The diarrhœa rate did not exceed 0·4 in London, whereas it averaged as much as 1·2 per 1,000 in the twenty-seven provincial towns. The death-rate from scarlet fever, which had been 0·64 in each of the two preceding months, rose to 0·76 per 1,000 during October; in the corresponding periods of 1881 and 1882

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the death-rates from this disease in the twenty-eight towns were 1·03 and 0·79 respectively. No death from scarlet fever was returned last month in Brighton, Plymouth, Bolton, Huddersfield, or Halifax; whereas in the other towns the death-rate from this disease ranged upwards to 1·2 in Salford, 1·6 in Cardiff, and 2·9 in Leeds. The rate of mortality from 'fever' (principally enteric), which had risen steadily in the four preceding months from 0·23 to 0·41 per 1,000, declined to 0·37 during October. The death-rate from fever in London was 0·35 per 1,000, and was slightly below the average rate in the twenty-seven provincial towns, among which it was equal to 1·0 in Portsmouth and 1·2 in Preston. The death-rate from measles in the twenty-eight towns, which had declined from 0·72 to 0·28 in the four previous months, rose again to 0·32 during October; in the twenty-seven provincial towns the death-rate from this disease slightly exceeded that recorded in London, and was equal to 1·1 in Salford and 1·6 in Newcastle-upon-Tyne. The rate of mortality from whooping-cough during October was equal to 0·26 per 1,000, against 0·31 and 0·33 in the two preceding months; in London the whooping-cough death-rate was equal to 0·26 per 1,000, and corresponded with the average rate in the twenty-seven provincial towns, among which the highest rates were 0·8 in Brighton, and 1·4 in Huddersfield. The rate of mortality from diphtheria showed a further increase upon the rates returned in recent months; in London the death-rate from this disease was equal to 0·27 per 1,000, and was considerably more than double that recorded in the provincial towns, among which it did not average more than 0·11. In Leeds 7 deaths were referred to diphtheria last month, and in Nottingham 6. During the five weeks of October 40 fatal cases of small-pox were recorded in the twenty-eight towns; of these, 17 occurred in Birmingham, 11 in London, 9 in Sunderland, and one in Wolverhampton, Liverpool, and Newcastle-upon-Tyne, respectively. Judged by the returns of the Metropolitan Asylum Hospitals, the prevalence of small-pox in London last month showed a marked decline; the number of small-pox patients under treatment in these hospitals, which had been 57 and 60 at the end of the two preceding months, declined to 41 at the close of October. The average weekly number of new cases admitted to these hospitals was 7 during last month, showing a further decline from the numbers in the two preceding months.

The rate of infant mortality in the twenty-eight towns, measured by the proportion of deaths under one year of age to births registered, was equal to 156 per 1,000 during October, and was slightly below that recorded in the corresponding period of last year, when it was 162 per 1,000. The proportion of infant mortality in London did not exceed 132, whereas in the twenty-seven provincial towns it averaged 175 per 1,000, and ranged from 103 and 111 in Brighton and Portsmouth, to 206 in Salford, 214 in Newcastle-upon-Tyne, and 245 in Preston. This very high rate of infant mortality in Preston was mainly due to excessive fatality of diarrhœal diseases, the mortality from which in that town has, during each of the last three months, considerably exceeded that recorded in any other of the twenty-eight towns.

The death-rate from diseases of the respiratory organs, judged by the metropolitan returns, was below that recorded in the corresponding period either of 1881 or 1882. The average weekly number of deaths referred to these diseases in London during October was 260, and the annual death-rate was equal to 3·4 per 1,000, against 4·1 and 4·0 in the corresponding periods of 1881 and 1882. The annual death-rate from these diseases in Liverpool last month was 4·9 per 1,000.

The causes of 399, or 2·4 per cent., of the deaths in the twenty-eight towns during the five weeks of October were not certified either by a registered medical practitioner or by a coroner. The proportion of uncertified deaths was only 1·3 in London, while it averaged 3·3 per cent. in the twenty-seven provincial towns. All the causes of death during the month were duly certified in Portsmouth and Plymouth, whereas the proportion of uncertified deaths was equal to 5·6 in Liverpool and in Huddersfield, 11·0 in Wolverhampton, and 12·4 in Halifax.

Among the population living in the outer ring of suburban districts around London, estimated at rather more than a million persons, the annual death-rate during October from all causes was equal to 14·3 per 1,000, against 14·5 and 15·2 in the corresponding months of 1881 and 1882. The annual death-rate from the principal zymotic diseases in these suburban districts was 1·6, and showed a further decline from the rates recorded in recent months. During the five weeks ending the 3rd inst. 59 fatal cases of diarrhœa, 29 of scarlet fever, 23 of whooping-cough, 22 of 'fever' (principally enteric), 18 of diphtheria, 11 of measles, and not one of small-pox, were recorded in the outer ring. The fatality of diarrhœa, scarlet fever, and measles, showed a decline, whereas that of 'fever' showed an increase. Seventeen deaths from scarlet fever, 10 from whooping-cough, and 10 from fever, were registered in the district of West Ham. Of the 18 fatal cases of diphtheria in the outer ring, 5 were recorded in Harrow sub-district, and 6 in the district of Edmonton. Five deaths were referred to fever in the district of Brentford.

SPECIAL REPORTS.

NORTH-WESTERN ASSOCIATION OF MEDICAL OFFICERS OF HEALTH.

A MEETING of this association was held at Birkenhead on Oct. 11; Dr. Rayner, of Stockport, in the chair. Some of the members made a visit of inspection to the new public baths, Argyle Street South; the new pavilion for infectious patients, Livingstone Street; and the disinfecting premises, King Edward Street. The business commenced by the reading of the minutes of the last meeting. Dr. Fentem brought up the case of the recent appointment of medical officer of health by the Bakewell Urban Authority. The late medical officer, who had served the board faithfully since 1872, had been set aside, and a gentleman who had acted as assistant to a local practitioner appointed in his place. A resolution expressing the regret of the association at the action of the Bakewell Authority was passed. Dr. Vacher, medical officer of health for Birkenhead, read a paper on the spread of infectious diseases by means of the milk supply, and concluded by urging that milk producers and sellers should be under the control of the Local Government Board rather than the Privy Council, and that model by-laws for the guidance of local authorities in regulating and controlling the milk supply should be prepared and issued by the Local Government Board. Dr. Vacher was also in favour of local authorities having power to require milk dealers to furnish lists of their customers to the authorities on demand. The chairman, Dr. M'Nicoll, and Mr. Corbett joined in the discussion, and it was resolved to bring the views of the association under the attention of the Local Government Board.

ASSOCIATION OF ENGINEERS AND SURVEYORS.

ON Sept. 8 a district meeting was held at Bury of the Association of Municipal and Sanitary Engineers and Surveyors, when there was a very good attendance of members, it being described as the best yet witnessed at any similar meeting. The members met in the Council Chamber, which had been kindly placed at their disposal by the Mayor, who was present in his official capacity. Among the gentlemen present were:—Mr. W. H. White, M. Inst. C.E., city engineer of Oxford, and president of the association, who presided; Messrs. R. Vawser, M.

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Inst. C.E., Manchester, local secretary; Mr. J. Cartwright, Assoc. M. Inst., C.E., Bury; A. M. Fowler, M. Inst. C.E., Manchester; E. R. S. Escott, C.E., borough engineer, Halifax; J. H. Cox, C.E., borough surveyor, Bradford; J. P. Spencer, Assoc. M. Inst. C.E., Newcastle-on-Tyne; Joseph Mitchell, borough surveyor, Hyde; George Jennings, borough surveyor, Rotherham; Richard Porter, C.E., borough surveyor, Wakefield; G. B. Jerram, Assoc. M. Inst. C.E., surveyor to the Walthamstow Local Board; Alfred Creir, borough surveyor and water engineer, Lancaster; S. S. Platt, Assoc. M. Inst. C.E., borough surveyor, Rochdale; George Eaton, borough surveyor, Crewe; Joseph Swarbrick, surveyor to Local Board, Withington; William Stubbs, borough surveyor, Over Darwen; A. Greenwood, surveyor to Local Board, Todmorden; Richard Amistead, surveyor to improvement commissioners, Bingley; Joseph Hague, surveyor to Local Board, Burton; W. L. Rothwell, Bury; W. Wellburn, Middleton; Wm. Dent, surveyor to Local Board, Nelson; James Diggle, A.M.I.C.E., borough engineer, Heywood; Thomas Heywood, surveyor to Local Board, Barton; J. P. Wilson, Bury; R. Pickering, Whitehaven; R. Brierley, town surveyor, Newton-in-Mackerfield; John Cook, surveyor to Local Board, North Brierley; Joseph Lobley, Hanley; John Wilson, Bacup; C. L. M. Wilson, Bacup; G. Biddle, L. and N. W. Railway Company, Liverpool; Robert Thompson, Waterloo; J. Earnshaw, Ashton-under-Lyne; J. Allison, Manchester; Charles Jones, hon. sec., Ealing; J. A. Hall, Toxteth Park, Liverpool; Henry Whitlow, Sowerby Bridge; and Tom Gledhill, Heckmondwike. Visitors: The Mayor of Bury (Alderman Duckworth), Alderman Cook (chairman of the gas committee), Councillor Tuke (chairman of the streets, &c., committee), Mr. T. Newbigging, Manchester; Mr. Joseph Brierley, Blackburn; and Mr. John West, engineer to the Manchester corporation gasworks.

The president welcomed the members present, and said he was pleased to see so large an attendance.

Mr. R. Vawser was again elected district secretary.

Public Works of Bury.

Mr. J. Cartwright, borough surveyor and engineer, then read a long paper on this subject, of which we give a summary of the sanitary division.

Waterworks.

The waterworks were established under an Act obtained in 1838, and the main source of supply until 1846 was a small impounding reservoir 3¾ acres in extent, with a gathering ground of 170 acres, with a capacity of 5¼ million cubic feet, at Shuttleworth; and a small service reservoir of 3¾ acres at Spouthouse, with a capacity of 1½ million cubic feet. Shortly after the Improvement Act of 1846 was got the demand increased, and the company got powers to construct the Gin Hall reservoir, 14 acres in extent, with a capacity of seven million cubic feet, and a gathering ground of 160 acres, with powers to utilise Longcroft Brook; but the enormous compensation demanded by millowners on the stream led to the latter scheme being abandoned. The demand increased, and the company in 1853 got a bill to construct a reservoir at Calfhey, about eight miles away, but owing to the opposition of a rival company the Bury company was transformed into the Bury and Ratcliffe Company with a district about 20 miles in length, with an average width of four miles, and embracing some 20 townships. The Calfhey reservoir was constructed, with a capacity of about 22 million cubic feet, and a gathering ground of 872 acres. The first conduit from this reservoir, and the only one in use until some three or four years ago, was laid with earthenware pipes to a small service reservoir at Holden Wood, about a mile below the impounding reservoir. This conduit was now superseded with an 18 inch iron main which enables the Gin Hall reservoir, now used as a service reservoir, to obtain a much more adequate supply. Soon afterwards the company acquired the Holden Wood reservoir, constructed some years previously to supply mills down to the junction with the river Irwell, with a gathering ground of 349 acres, and a capacity of 14 million cubic feet, but now used only as a compensation reservoir, the company having to allow six cubic feet per second to millowners. In 1872 the commissioners purchased the works of the company, and as the wants of the district had increased, also purchased the undertaking of the Haslingden and Rawtenstall Waterworks Company, with a gathering ground of 1,300 acres, a surface of 88 acres, and a capacity of 56 million cubic feet, and capable of supplying a much larger district than it was originally intended for. This purchase rendered the immediate carrying out of one of the main provisions of the Act of 1872 unnecessary—the construction of the Ogden Valley reservoir—but for which all the land, &c., necessary had been purchased, and in connection with which a gathering ground of 964 acres had been acquired. This new reservoir would have a surface of 53 acres, and a capacity of 56 million feet. At Clark's Hill, about 3½ miles off, a service reservoir had been constructed to supply the outlying districts to the south of Bury, and capable, in case of accident to the mains above Bury, of supplying the town itself. It had a capacity of 7½ million cubic feet, and was made at a cost of 21,000*l.* The purchase of land for the Ogden reservoir had cost 27,000*l.*, and there had been a great expenditure on new mains, &c.; 3,060*l.* in the renewal of works at the Calfhey reservoir, the removal of hundreds of tons of silt, the renewal of clows, fencing, &c., and a new bywash. The committee had under consideration the construction of a high service reservoir at Haslingden, at about 1,000 feet elevation, which would have to be supplied by a pumping station erected in the Ogden Valley. The water would have to be lifted 320 feet in a length of 1¼ mile. Land for this had been acquired at a cost of 1,670*l.*, and the cost of the reservoir pumping station, &c., was estimated at about 8,000*l.* in addition. The total expenditure on capital account on the works was 367,561*l.* 8*s.* 8*d.*, and the revenue last year was 25,281*l.* 1*s.*, and the expenditure about 27,800*l.*, showing a loss of about 2,500*l.* on last year's working.

Hospitals and Baths.

The paper next described the baths, which, it was said, were completed at a cost of 3,500*l.*, and were opened in 1864, and the different classes of baths, plunge, slipper, private, and Turkish were particularised. They were well attended, and it was intended shortly to extend them. The annual outlay was about 520*l.*, and the revenue 400*l.*, so that the yearly loss was about 120*l.* The necessity of new building by-laws was named, and the objection to adopt the model ones of the Local Government Board in their action hindering instead of helping to secure sanitary buildings. The Hospital for Infectious Diseases was described, it being on the pavilion principle, with four wards, and having accommodation for fifty beds, with every modern requirement. The total cost was about 3,000*l.*, or about 60*l.* per bed.

Disposal of Sewage.

As to the disposal of sewage nothing had yet been done, but land for purification works had been purchased, and plans for intercepting sewers, &c., were prepared. It was intended to precipitate the sewage in tanks, and then filter it over the land. The sewers were laid in straight lines from manhole to manhole, with ventilation by the manholes; the street grids were all trapped with gullies to prevent the sewers from being filled with dirt. The length of the sewers was 44¼ miles. During the last six years 20 miles of sewers and cross drains had been laid.

The destructor kilns consisted of one of Fryer's patent four-celled destructors, completed Nov. 1881, and erected in such a manner as to admit of extension without

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lteration. The heat evolved from the combus- e material is utilised for generating steam in a lar boiler used in connection with a mortar mill f grinding about 10 cwt. of mortar per hour, for re is a ready sale at about 5*s.* per ton. The last king is 1,312 tons of mortar sold at 5*s.* per ton, 328*l.* 4*s.* 3*d.*, which, after deducting expenses, balance to the credit of the mill of 52*l.* 3*s.* 9*d.* gement of the flues is such that heated gases can utilised through the boiler or allowed to pass the chimney by a main flue which has been as well as the chimney and other parts, to allow extension of the furnaces. The chimney is igh. There is an engine-house, store-room, and l road, with substantial retaining walls of stone, ess to the top of the cells where the rubbish is ect to the charging-chambers. The store-room ten tons of lime, and the engine-house is large r extension, and contains an eight-horse engine, four furnaces are arranged on an inclined plane, om the top, and the material, after remaining in ce two hours, is withdrawn in the form of being reduced to one-third of its former bulk, make excellent mortar with lime of one-third rd clinker. The flues require cleaning out once nths, when about twenty loads of dust are taken ut 16 tons of material are treated per day, an f four tons per cell; the total amount for the g March last being 4,352 tons in 6,885 working a cost of 1*s.* 8¾*d.* per ton for actual working The original cost and royalty was 3,500*l.*

SONS AS TO COST OF VARIOUS MODES OF EXCRETA DISPOSAL.

uncillor Tuke read a paper upon this subject. that in the year 1879 he prepared a statement alth committee showing the comparative cost of Lancashire midden privy with the pail closet, hat time was being adopted at the rate of from 00 per year. He laid before the committee a f the information he now purposed to submit, tatistics up to March 31, 1879. For the par- nce that date he was indebted to the sanitary Mr. W. Wilkinson, whose courtesy and atten- now desired to acknowledge. After giving the s of the number of ashpits and pails from 1874 to last he said :—

he above statement it appears that the average st of each pail closet since 1877 has been 12*s.* 5*d.*, ch midden privy 6*s.* 8*d.* But some explanation l with these figures, otherwise erroneous con- ill be drawn from them. The total number of the borough is 10,732, and the number of d closets of both classes is 8,673, of which 567 in mills, workshops, schools, &c., other than , viz.—170 pails and 397 midden privies. De- 67 privies from the total number (8,673) it leaves use in dwellings. It is therefore manifest that ,626 householders within the borough share the f a privy with one or more neighbours. It at about 400 pail closets are used for more than y, viz.—for 900 houses, the remainder serving one h. The total number of pails at present in use 69, minus 170 in mills, &c., leaves 3,397 for the 99 families, or at the rate of 1·12 houses per e total number of midden privies being 5,104, 7 in mills, &c., leaves 4,707 for the use of 6,833 or at the rate of 1·45 per midden privy. These ns have a direct bearing upon the weight of o be removed, but need to be a little modified in ctical application, as the larger middens cost s to empty in proportion to the houses they serve e one privy serves only one house. To guard e erroneous assumption that the cost of the pail yearly decreasing as might be deduced from the yearly statements, it is necessary to know that the system, being only a few years old, the first 'crop' of pails (including the stock in hand when the extension was checked), and other equipments is only just wearing out. For the past three years the department had had practically no charges on this account, but the pails are now rapidly approaching dissolution, and unless the system is to be definitely abandoned, a heavy cost must shortly be incurred which will raise the average to its normal level. There is a considerable saving practised by the Health Committee in carrying out this system which no consideration of economy will justify. As the pail system expanded, the charges of the health department became so onerous that the committee decided to abandon the practice of washing the pails and of employing the vans to carry the excreta to the depôt; and the pails have since been carried to a barrel-cart and the contents tumbled in, and the dirty pails, unwashed, are returned to the closets. Then the barrels, bespattered with their unlovely charge, are proudly paraded through the streets, to the infinite disgust of the people, whose senses, day by day, are outraged and sickened by the intolerable sight and smell. According to an estimate furnished by the inspector in 1882, it appears that if the vans were used and the pails washed, as in a decently conducted system they would be, the extra cost per pail per year would be 4*s.* 5*d.* for labour only, allowing nothing for the extra cost of pails, depôts, &c. Applying these explanations to the average cost of the two systems, the following results appear to be evolved.

I have already pointed out that the average cost of the midden privies for the past seven years was 6*s.* 8*d.* each, with an average servitude of 1·45 houses to each privy, or 4*s.* 7*d.* per house. The average cost of the pail closets was 12*s.* 5*d.*, with an average servitude of only 1·12 houses per pail. To properly compare the relative cost it is necessary to reduce the two systems to a common degree of servitude, and I take 1·45 the servitude of the midden privies, as the unit for comparison in each case. Therefore if the servitude upon the pail closets were raised to that endured by the midden privies, the cost would be increased from 12*s.* 5*d.* to 16*s.* 1*d.* per pail. And if the pails were properly washed and the vans employed, the cost of the complete system would be raised by the addition of 4*s.* 5*d.* to the enormous aggregate of 20*s.* 6*d.* per pail, or 14*s.* 2*d.* per house.

The Combined or Modified Privy.—During the past few years the Health Committee, shocked at the increasing financial load imposed by the pail system, have cast about for some plan embracing the economical advantages of the midden privy without its unsanitary objections, and have, as a kind of compromise, been constructing what they term 'modified privies,' whose characteristics are said to be—1. protection of the contents from outside moisture; 2. protection of the surrounding earth from fæcal soakage from the inside; 3. complete admixture of the ashes and fæcal matter within the midden; and 4. case of removal. I need not enter into any description of this privy, which is certainly a great improvement upon the old midden privy. It has nevertheless the disadvantage of requiring the excreta to be carted through the streets, and the cost of removal, so far as the inspector can judge, is about the same as the midden privies, viz. 6*s.* 6*d.* to 6*s.* 8*d.* per year, or 4*s.* 7*d.* per house.

The Slop-Water Carriage System.—This is, I suppose, the system successfully introduced into Salford some years ago by Mr. Fowler. It is in use in Bristol, Salford, and Hyde, where the Bury Health Committee investigated it a few years ago. In 1879 I recommended that a trial of the system should be made in Bury, and eighty-one of these closets are now in use in the borough. I need not describe the closet (which is doubtless well known to you all) further than to say that it is a deep stoneware hopper, terminating in a siphon bend, above which the slop-water from the grid in the yard empties itself. It is found that in most cases this supply keeps the closet clean and sweet; but when any stoppage appears a bucket of water thrown down clears the obstruction away, except where it occurs

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in the insoluble form of a scrubbing-brush, boot, or other kindred matter. I am not concerned this morning to deal with my subject from any but a mercenary point of view, so will proceed at once to demonstrate the economy which would follow the general adoption of the system in Bury. From the sanitary inspector's unpublished report for the current year I find that 2,758 barrels of excreta were removed from 3,569 pails at a cost of 5*s.* 9½*d.* each; and 4,469 loads of rubbish also from the pail closets at a cost of 4*s.* 2½*d.* per load. This shows an average of 1·22 loads of dry rubbish per pail closet per year, equal to 1·58 loads if the servitude were equal to that endured by the midden privies. From the 5,104 midden privies was removed 12,175 loads of rubbish, giving 2·38 loads per privy each year, at a cost of 2*s.* 6*d.* per load. Deducting the 'reduced' weight of dry rubbish from this—ascertained by the pail closets to be 1·58 loads—it leaves 0·80 loads per privy, which must be excreta or extraneous matter. This, multiplied by the number of privies, gives 5,104 × ·80 = 4,083 loads of excreta annually carted from these privies, besides that left to saturate the dry ashes and soak the surrounding ground. The saving to be effected if the slop-water system were generally adopted seems to be as follows:—

	£	s.	d.
2,758 barrels of excreta now conveyed from pails and costing 5*s.* 9½*d.* each would go down drains	801	10	10
4,469 loads of rubbish, now costing 3*s.* 3*d.* per load, would, if removed in bulk and in daylight, cost only about 2*s.*, or a saving of 1*s.* 3*d.*	279	6	3
4,083 loads of excreta, now carted from the midden privies at a cost of 2*s.* 6*d.* per load, would go down the drains	510	7	10
3,092 loads of rubbish, now removed at night at a cost of 2*s.* 6*d.* per load, would then be removed in daylight. This would save two-ninths of the wages of the men, and the whole cost of lamps, oil, carbolic powder, &c., besides the fact that the men could, and would, do much more in daylight than they do in the dark—save, say, 20 per cent., or 6*d.* per load	202	6	0
Total saving	£1,793	10	7

As the total cost of the nightsoil department, exclusive of the destructor, was this year 3,065*l.* 8*s.* 9*d.*, it appears as if it might be reduced in round numbers to 1,300*l.*, or an average cost of 3*s.* per closet, and this agrees very nearly with the sanitary inspector's experience; he estimating the cost at 3*s.* 2*d.* per closet. Against the saving to be effected by the slop water system must be set the extra expense of treating the effluent in any system of sewage purification. I have no practical experience of this cost; but, so far as I remember the Rivers Pollution Commissioners' reports, they made very light of the increased impurity of the sewage of water-closetted towns over that of the North of England towns where ash-middens are general. The first cost of constructing a slop water-closet is, no doubt, a few shillings higher than the cost of forming a modified privy. We find the cost of converting a midden privy into a modified privy is about 30*s.*, and I suppose the cost of conversion into a slop-water closet would be under 2*l.* As the cost of constructing a properly equipped pail-closet is much more than this, the question of first expenditure need not be a hindrance to its adoption. I have tried to lay before the meeting nothing more than the actual facts ascertained from our own experience, without commenting upon or drawing conclusions from them, and now leave the application in your hands, who are by your trained experience far more competent to deal with them than I can possibly be.

Mr. Fowler said that London in 1832 was visited by a great plague of small-pox. At that time the midden system was in operation, but an Act was passed to do away with that system. It was done promptly, and from that day to this London has been the most healthy city in the world. It did not fluctuate in its death-rate like other towns. He strongly condemned the Manchester system, and said they should try to do away with the pestiferous receptacles which was the result of that system. The system of slop water-closets Mr. Tuke had referred to was a patent of his own, and he was entitled to a royalty; and it was, in his opinion, the most economical, as it did not use towns' water.

Mr. Allison said that Mr. Fowler in speaking of the midden and privy system and water carriage system had not given Manchester fair play within a hundred per cent. He attacked the midden and open privy system, but he must have heard of the pails having been removed once a week, so that before the end of the week there was no nuisance at all. The great danger was from decaying vegetable matter, which was thrown into the ashpits and allowed to accumulate for three, six, or nine months in the large towns. The emanations from those things were the cause of danger.

Mr. Jerram said it was a pity that the period for discussion was so short, as it was by discussion that they elicited information which was useful. They were indebted to Mr. Tuke for the statistics he had given of the cost of the pail system. In the South of England they had advocated the water carriage system for years, but that was the first time he had been able to get the cost of the pail system, although he had tried to do so. They found that the cost of the pail was 20*s.* 6*d.* per closet, whereas they knew that a pound a closet would go a long way towards providing a sewage system in any district they had to contend with. The quantity of sewage collected by the pail system was comparatively small, because there was the greasy water from the slop-stones, which, if the Rivers' Pollution Act were carried out, would have to be provided for, and why could they not deal with the whole subject at one place? It was, therefore, gratifying to find the pail system had been a failure; it was indecent, and not conducive to health. There was always plenty of land a short distance away where the sewage could be treated, and where vegetables could be grown, as was done at Birmingham and other large towns. He believed the matter was not so difficult of solution as many imagined.

Mr. Spencer said they were all pretty well agreed in condemning the old privy system, and it was like whipping a dead donkey to express condemnation of the system, but unfortunately unlike dead donkeys, which were scarce, those privies were plentiful in many towns, and there appeared to be an inclination to palm them off on many towns in the North of England. Even with water-closets the difficulty was how to get rid of the ashes, and they must not suppose that in establishing a water-closet system they had got rid of that difficulty. In many cases the water supply was inadequate, and the charges exorbitant, and they must not forget that in estimating the cost of water-closets. As an improvement on the horrible privies he welcomed the water carriage system as a step in the right direction, but they must guard themselves from jumping to the conclusion that that solved the question. He thought they might have both systems side by side if they had an efficient system of collection.

Mr. Lobley said it was well known that the Rochdale pail system was an expensive one. At Hanley they had adopted Turner and Robertshaw's modification by which the liquid and solid excreta were separated. The liquid matter by a siphon ran into the sewers. He found there was no objection to that, and the cost of collection was greatly reduced. At Hanley they had gone back to the barbarous system of collecting in nightsoil carts. He did not think that the additional expense at the outfall works in introducing the water carriage system would be such as to be worthy of consideration. In his district they had tried the slop-water closets, and found no objection to them, although they did sometimes get an old waistcoat, rats, and cats out of them. London was referred to by Mr. Fowler as a healthy town, but that was in spite of the fact that the water-closets were notoriously bad. He did not see that the matter of ashpits should be mixed up with water-closets. He did not think they need wait for a water-closet which would not get out of order, for at Liverpool the system was adopted under inspection, and was a great improvement on the pail system.

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THE BERLIN SANITARY EXHIBITION

(FROM OUR SPECIAL REPORTER.)

(*Concluded from page* 130.)

WARMING AND VENTILATING.

THE average Frenchman likes to take these two tonics for his physical system in separate and distinct doses. If he 'goes in' for ventilation he either goes out of doors or opens all the windows, and, to show his abhorrence of half measures, has all the windows of his house so made that they must be either all open or all shut. If warmth is his requirement he shuts all the windows and all the doors, heats his stove to a furnace heat, and stuffs or stifles, destitute, in dread of a draught, of all ventilation. One has but to look round the Berlin Exhibition to see how anxious the German is to scientifically combine the two, taking each in moderation, and so combined as to be productive of the highest possible condition of health and comfort. Where he fails is from an excess of science, so called. Here is a host of stoves all made upon some recently-discovered scientific principle, which appears all the more undiscoverable from the Old Gothic characters in which the explanation that requires explanation is printed. I don't envy the judges the task of trying at least one half of these inventions, and coming through now intense heat and now intense cold, and anon in clouds of smoke, to a decision. I dare say in those old German stoves fashioned by the potter out of clay, a brick or a tile more or less, or 'a vent,' or an inlet or outlet, here and not there, or there instead of here, makes all the difference; but as German tile stoves are never likely to be acclimatised in England, and as German ironmasters are busy driving out old earthenware with new iron stoves, borrowing most of their ideas from the English, any criticism on the former would not be for long germane to my subject.

The Germans are ingenious in their adaptations of stoves from the English, but they are all put to shame by the fine show made by David Grove, of Berlin, of Musgrave's admirably constructed Belfast slow burning stove. The same exhibitor also shows Andrew McLaren & Co.'s patent saddle-body boiler, so economical and effective for the heating of water; and C. Garreke, of Aix-la-Chapelle, makes a good and effective exhibit of the excellent and ingenious boilers of Hartley & Sugden. Thus far England is well to the fore at Berlin. One of the largest German shows is made by the Lauchhammer Ironworks Company. They exhibit a great variety of close and a number of open stoves, some professing great novelty, but presenting little of it to an English expert, yet all showing very careful casting of good ornamental designs in iron, while the nickel and brass embellishments are not overdone, except in the case of one or two open fire-grates. The most notable stove of the collection is a patent combined bath and room stove, with a grate that is ingeniously raised or lowered by the turn of a handle accordingly as it is desired to heat the water in the column for the bath or simply the air for the room. The firm has one of the oldest and largest works in Saxony, dating from 1725, and producing, besides all sorts of stoves, handsome utilities and adornments in cast iron, builders' iron requisites, tasteful enamel ware, artistic works in bronze casting, and heavy and ponderous productions for gas works and machine and boiler work. The firm shows something of all these at the exhibition, and shows well.

As iron enters so largely into construction for ventilating and heating purposes, several of the large ironmasters of Germany have extensive exhibits, and as every new construction is entitled to a place as either facilitating handiwork or lessening the dangers attendant upon it, there is plenty of machine and boiler work shown. The largest exhibitors of the latter are Knaudt & Co., of Essen, the flanging and welding being of the highest class of work. Like the great Krupp of Essen, the firm give an account of what they do for the physical and mental and moral well-being of their workpeople; and the result is seen in the fine class of work they turn out. The Königin-Marienhütte Coal and Iron Company of Saxony, who employ 1,670 persons, make a fine show of rolls, girders, boilers, and general cast and wrought iron work, in a handsome and separate pavilion. One of the largest shows of iron, as applied to heating and ventilating purposes, is made by the Kaiserlautern Ironworks Company, of the Rheinpfalz, whose furnace stove for rooms is a handsome and seemingly useful construction. One or two open fireplaces shown by this firm are remarkably stately in over mantels, yet pleasing in general effect. Of the other many stove exhibits I can only indicate, as more especially worthy of notice, a modification of the American stove manufactured by a Nuremburg Company, and exhibited by A. Benver, of Berlin; a handy transportable stove shown by J. Stahlkopf, of Berlin; and a good Universal by R. Panby, of Berlin.

In ventilation there is nothing better shown than the now well-known English Æolus water ventilator, the active and effective working of which was a source of great interest to the good German folks. The Lauchhammer Works exhibit a good sample of Bruning's deflector, which seems to take well on the Continent; while one of the best general collections for ventilation by simple and familiar means is made by Adolphe Müller, of Cologne. Among the numerous means for regulating ventilation by means of the room window is the very neat and ornamental contrivance of J. J. Ross, of Cologne, for replacing the upper panes of glass in a window with three-cornered tile-like pieces of ornamentally coloured glass, so disposed that the outer air is drawn upward into the room without danger of downward draught. Thum's patent security window provides at once for ventilation and the security of the window-cleaner. The window for two-thirds of its height is of fold door-like frames in the French style, while an upper whole draws down, and both alike can be cleaned on the outside with safety within the room. C. Müller, of Berlin, shows Marasky's patent for opening and closing ventilating upper windows, which is at once simple and effective.

TOWNS' IMPROVEMENT.

To those anxious to go into details that it would be impossible to reproduce here as to German towns' improvements, the plans and sections deposited at the exhibition are a rich store, from which the expert and the professional may gather many a useful hint in what has been done in the way of extension and improvement in the cities and towns of Berlin, Augsburg, Leipzig, Munich, Stuttgard, Ulm, Frankfort-on-the-Maine, Breslau, Bremen, Bremerhaven, Cassel, Chemnitz, Dresden, Dortmund, Dantzig, Hamburg, Hanover, Gratz, Nuremburg, Dusseldorf, Hanau, Elberfeld, Karlsruhe, Erfurt, Cologne, Magdeburg, Linz, Salzburg, Stettin, and many other towns.

To the general observer, however, a visit to two or three of the older places themselves will be far more instructive than any plans, sections, or technical reports, and what is new is so new, is so much of to-day, that one has no difficulty in distinguishing it from the old. As evidences that town progress and extension are general in Germany, and due to no special circumstance of trade, time, or place, take the, in most respects, three very different localities of Nuremburg, Hamburg, and Hanover which I have recently seen, as well as their records at the Berlin Exhibition. The general idea of the first named is that it is untouched by time, that the present age finds it as the mediæval ages left it, and that all there is of it is quaint and curious. That is true not only of the old moat and the old walls, but of nearly every street and almost every house they encircle—particularly those of the old Market Place; and even of the market ways and many of the market people themselves. Quaint old huts still do duty for modern stallage, and produce is brought from the country in the long, narrow, springless apologies for waggons, drawn by oxen as in the days when Nuremburg was young; but through that Market Place were running steam trams when

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municipal authorities in this country were vociferating against such an innovation as perilous in the extreme. Those new tram rails and those old ways, the street locomotive and mediæval country waggon, side by side, in the old Nuremburg Market Place, are typical of the Nuremburgers—the last to destroy the old, the first to adopt the new—for they were the first Germans to project a railway, while all around the town tells of the wealth that is won from railway works and the construction of the most improved machinery. The shops of the town are of the oldest, with the newest of goods; and the antiquity of the old city within the walls is amply contrasted by the freshness and novelty of the new town spreading in all directions without, with modern residences for 'all sorts and conditions of men,' from manufacturing and merchant princes' mansions down to labourers' cottages—all telling of space, proportion, ventilation, and comfort such as they who built Nuremburg of old and made it famous never dreamt of. In one point the two peoples are the same in spirit—making the most of the present; and, while regarding the past, building up for the future.

They are doing that in Hamburg, and it is not the fault of the Hamburghers if, as compared with the burghers of Nuremburg, they show so little of the very antique, seeing that most of it was burnt up years ago, and what was left is now out of the way and obscure. The mansions of the old merchants, with their quaint gabled fronts, carved, gilded, and darkly glazed, with their many roomed interiors, rich of ceilings and strange in galleries, are rudely split up into offices and warehouses for modern merchants whose villa residences border the lake that glistens and glows on one side of the now great promenade of the city; magnificent on the other side in Regent Street shops and palace-like hotels. Some of the older and quainter parts of the town are down by the harbour, where a whole township of old houses, swarming with labourers and their families, is marked for destruction to give place to municipal buildings and offices, and would have been long ago destroyed, but for the difficulty of knowing what to do with the labourers, who must needs live near the spot that finds them work and living.

Hanover is a third and very different place, yet it makes similar progress in new houses, new streets, and new ways. Handsome houses and fine shops are putting in a new appearance in all directions, the shops coming so thick and fast as to outgrow the demand, and to look long and wearily for tenants. There is not much of the very old in Hanover, and the Hanoverians have not much respect for what remains. Old houses are ruthlessly pulled down to make room for new, and the suburbs daily extend with some of the most tasteful residences to be seen in Europe, the Gothic finding but little favour with owner and architect, whose classic taste tones down and purifies the more popular 'Italian style.'

In going through Hanover one is struck by the absence of working-class houses, and when one learns that the main wealth of the town is derived from manufactures, one wonders still more where the factories are, till it is ascertained that they and those who labour in them are to be found in a suburb mapped out on the air by its tall chimneys. There the working classes live and labour, and save Hanover from the difficulty of Hamburg. But there they are well housed, and everywhere in all the towns of which I have written, sanitation is better attended to than anywhere else on the Continent. In the better class of houses rooms are lofty, expansive, and are fast becoming freer of the evils which attend the dwelling of many families in one house in other parts of the Continent. Hence, however much in remote pastoral and agricultural districts, where living is scanty and education not flourishing, if not altogether absent, the people may emigrate in thousands and reduce the general population of the empire, the towns increase in size health and wealth to a degree astonishing even to an Englishman familiar with the growth of London and our large provincial towns.

Education and Competition.

Thus far as regards the relation of the Berlin Exhibition to Germany and the Germans; but every Continental exhibition has to be regarded from another point of view—its relation to other countries in general, and especially that one that has hitherto manufactured for all other countries—England. Looking at this Exhibition as a whole, the impression it leaves on my mind is that, if the manufacturers of this country are to successfully compete with those of Germany, we must take lessons out of the great book not only of sanitary, but manufacturing, social, and, above all, educational progress, which Germans have opened out to the world's view with this Exhibition. What Krupp does with such agencies he shows here in two or three exhibits of finely finished engines; but still more largely does he make it manifest in his magnificent show at Amsterdam, where, from very large guns for mowing down thousands in war, to finely finished rolls delicately turned for the working of precious metals on the way to money-making, everything bears the impress of more or less educated handiwork, and conscientious, painstaking labour. All that iron can do for the field of battle, all the machinery that is needed for ploughing the deep and developing the peaceful intercourse of nations, and the weightiest and finest of iron work for the workshop or manufactory—all are made at Essen, and made with an intelligence and skill that only the resources, mental and moral, as well as mechanical and material, of so vast and so well-educated an establishment could compass.

Many another exhibit, as well at Amsterdam as at Berlin, made by German ironmasters, show what culture can do for creating great trade by making good workmen, and where they do not turn out such good work as the English they are rapidly progressing in that direction; the irresistible conclusion being that if we do not learn more and teach better in England, they of Germany may not only soon overtake us, but pass us, on the road of foreign competition.

The Awards.

The length to which these notices of this important sanitary exhibition has already extended forbids even cursory glances at the very many individual and more scattered exhibits that would otherwise demand attention. A few of the notices of the judges' awards may, however, give an idea of the merits of some of them. Those judges have awarded forty gold and eighty silver medals. Though indirectly, through their German agents, several English inventors and patentees were exhibitors, but two were honoured with an award, the recognition in each case being a silver medal. One was the Westinghouse Brake Company, Limited, for the now world-renowned and adopted brake; the other the firm of Messrs. Ihlee and Horne, of Aldermanbury, London, who, among other exhibits, made that of the diving dress, in which a diver three or four times daily immersed himself in the Diver's Tank in a separate building, entrance to which was practicable only by payment of a fixed charge, and which nevertheless was crowded on the occasion of each representation. David Grove, of Berlin, who exhibited so many English constructions, also received in consequence a silver medal.

Among the gold medallists are many whose exhibits I have more or less described—notably The People's Kitchen Association of Berlin, the Bremen Life Boat Association, and L. von Bremen & Co.; and the philanthropists and manufacturers, Frederick Krupp, of Essen, and W. Spindler of Berlin. Though I have not described, because of the general familiarity with similar appliances, the extensive exhibits by states and public benevolent associations of the means of succouring the wounded on the field of battle and otherwise mitigating the horrors of war, the judges have been keenly alive to their merits, and, as was to be expected at a national exhibition of the most military nation in Europe, have been prodigal of golden honours; nor did they confine them to their own country, for

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the Red Crosses of Austria, Hungary, and Holland have been decorated with gold medals. The Siemens are not without honour in their own country, gold medals being awarded to Frederick Siemens, of Berlin and Dresden, and Siemens and Halske, of Berlin. Agricultural development is honoured by a like award to the Eckert Agricultural Machinery and Implements and Waggon Works Company, of Berlin, while mechanical and manufacturing progress is recognised in the firms of Schultz, Knaudt, and Co., of Essen, the Berlin and Anhalt Machine Company, the Lausitzer Machinery Works at Bautzen, the Germania Works of Chemnitz, the Boiler Inspection Association, and in the person of the able engineer, Scharowsky, of Dresden. Three professors—Dr. v. Fodor, of Budapest, Dr. Georg Recknagel, of Kaiserlautern, and Dr. Cohn, of Breslau—have also been rewarded with gold medals.

Among the silver medallists are the Technical School of Design of Wiesbaden; Dr. A. Vötsch, of Nürtingen; the Public Baths Association of Bremen; Dr. Lassar, of Berlin; the Berlin Asylum for the Houseless, the Children's Hospital at Dresden, and the Marburg Association for the Cure of Children by providing them with Medical Treatment on the Sea Coast; Dr. T. Petruschky, of Königsberg, in Prussia; Dr. Pissin, of Berlin; Dr. F. Beeley, of Berlin; Dr. Neuber, of Kiel; Dr. F. von Heyden, of Dresden; Dr. B. Spitzer, of Hungary; the German Dentists Association; Dr. Nicolai, of Freiburg (Baden); Dr. K. L. Kahlbaum, of Göritz; the New Hanoverian Asphalte Company of Berlin; the Frankenthal Machinery Company; Dr. F. Hulwa, of Breslau; Professor Dr. E. Hartnack, of Potsdam; the Brothers Schmidt, of Weimar; Naglo Brothers, of Berlin; the Kaiserlautern Ironworks; the several Knappschaftsverein of Tarnowitz, Bochum, and Saarbrücken; the Mine Owners Associations at Essen, Zwickau, and Bochum; Professor Dr. Obernier, of Bonn; the Judlin Works at Charlottenburg; Dr. W. Mencke, of Holstein; and Dr. P. Börner, of Berlin.

THE AMSTERDAM EXHIBITION.

THE following selection from the list of awards to British exhibitors at the International, Colonial, and Export Exhibition, Amsterdam, 1883 (exclusive of India and the Colonies), contains those awarded to exhibits more especially relating to Hygiene and Sanitation:—

Diplomas of Honour.—Group IV.—Furniture, Fittings, and Accessories: Doulton & Co., London (by acclamation). Group VI.—Food and Chemicals, &c.: J. S. Fry & Sons, Bristol; Price's Patent Candle Company, Limited, London.

Gold Medals.—Group IV.—Furniture, Fittings, and Accessories: Normandy's Patent Aërated Fresh Water Company, Limited, London; T. Bradford & Co., London; John Gosnell & Co., London. Group VI.—Foods and Chemicals: Rimmel, London (Hors concours, member of the jury); Lewis Berger & Sons, Limited, London; W. J. Bush & Co., London; John Gosnell & Co., London; T. C. Calvert & Co., Limited, Manchester; North British Rubber Company, Edinburgh; W. Warne & Co., London. Group VII.—Mechanics' Machines, Tools, and Means of Transport: T. Bradford & Co., London.

Silver Medals.—Group IV.—Furniture, Fittings, and Accessories: W. Woollams & Co., London; Musgrave & Co., Limited, Belfast; Salter & Co., West Bromwich. Group V.—Textiles, &c.: Pryce Jones, Newtown, Wales. Group VI.—Foods, Chemicals, &c.: Henry Churchman, Horsham; John Corbett, M.P., Stokeley, Worcester; Francis Falkner, Dublin; Green & Son, Cape Town; William Hay, Hull; Lamb & Watt, Liverpool; China Sugar Refining Company, Hong Kong; Dr. Siegert & Sons, Trinidad; Maconochie Brothers, Lowestoft; Spratt's Patent Company, London; Pearl Wine and Brandy Company, Cape Town; A. Boake & Co., London: Cantrell & Cochrane, Dublin; R. Cresswell & Co., London; E. Packard & Co., Ipswich; H. C. Stephens, London; J. Tullis & Son, Glasgow; Innes & Grieve, Edinburgh.

Bronze Medals.—Group IV.—Furniture, Fittings, and Accessories: British Siphon Manufacturing Company, London. Group VI.—Food and Chemicals: Carr & Co., Carlisle; Cornelia Ida Plantation, Demerara; J. Gray & Co., Glasgow; S. Gulliver, Aylesbury; W. A. Ross & Co., Belfast; Blaydon Manure and Alkali Company, Blaydon; B. F. Brown & Co., London; T. Christy & Co., London; Maltine Manufacturing Company, London; J. Richardson & Co., London; J. Sinclair, London; George Angus & Co., Newcastle; Ness & Co., Darlington; J. Williamson & Co., Lancaster; Roger Errington, Doncaster; Kerr & Tubb, Halifax; Barret & Elers, London; John White & Sons, Bingley. Group VII.—Mechanics, Machines, Tools, and Means of Transport: Clark, Bunnett, & Co., London.

Honourable Mentions.—P. A. Maignen, London; Branson & Co., London; Khoosh Tonic, Bitters Company, Liverpool; Langdale Chemical Manure Company, Limited, Newcastle-on-Tyne; United Asbestos Company, Limited, London; Kerr & Tubb, Halifax; J. Tullis & Son, Glasgow; Caloric Engine and Siren Fog Signals Company, Limited, London; Certaldo Marble Company, London.

INAUGURAL ADDRESS TO THE ASSOCIATION OF PUBLIC SANITARY INSPECTION.

THE following address was delivered by Mr. George B. Jerram, A.M.I.C.E., and M.S.E., &c., Surveyor and Inspector of Nuisances to the Walthamstow Local Board, at the Parkes Museum on Oct. 6.

After a few prefatory remarks, Mr. Jerram said: When we last met, the whole of the nations of Europe were in an intense state of nervous excitement as to the probability of that dread enemy the cholera visiting our shores. New laws were passed for the metropolis; orders to all sanitary authorities were issued by the Local Government Board offering suggestions as to how the enemy was to be met. Sanitary authorities took advice from their medical officers of health, increased sanitary inspection was ordered, and a general clean-up and investigation was the consequence. Local authorities were aroused from their usual state of lethargy, and medical and sanitary officers and surveyors were enabled to get improvements made and necessary sanitary work executed which had been delayed, and would have been still further delayed had not this alarm scared the community. Thus far the alarm has no doubt done good. It is satisfactory to note the increased interest the general public are taking in sanitary matters, and this is no doubt due in a great measure to the efforts that have for some years been made by such reformers as Mr. Edwin Chadwick and others, and to the holding of conferences by the Society of Arts, to the holding of health congresses, and to the information that has been spread by the members of the Sanitary Institute, Parkes Museum of Hygiene, and kindred institutions.

It is quite evident that no amount of sanitary inspection will be effectual until the public generally are made more conversant with the general laws that govern health, and with the fact that it is the duty of each one not only to take those measures which will serve to promote the health of the individual, but also that it is his duty to do so for the protection and safety of the community in which he lives. During the last few months, owing to the above-mentioned causes, and in answer to the outcry of the public, local authorities have had to take measures whereby they may ascertain the sanitary condition of their districts, and in a great number of places it was found necessary to engage more inspectors to assist the permanent staff in their duties. This fact alone shows that at the present time effectual sanitary inspection is rather the exception than the rule. It will be interesting to note the kind of men who were engaged for this duty, and it is to be feared that in many cases men have been engaged who are quite ignorant of the

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duties, and who have had no experience. I am afraid it is only too often thought by local authorities that anyone who is reasonably steady and bears an ordinarily good character, without any special qualification, will do to inspect nuisances, and in consequence in many instances men are engaged for this work who are not qualified or fit for so important an office. I propose, therefore, to lay before you what I deem to be the work of a sanitary inspector, and to inquire whether this work is done.

There has been lately a great discussion as to whether the designation 'inspector of nuisances' or 'sanitary inspector' should be used, it being thought by many that the latter name sounded better, while the former denoted an inferior office and duty. I find on looking through the Nuisance Removal Act, passed in the year 1855, that the words 'sanitary inspector' are there mentioned; and therefore this name is not a new one used for the purpose of covering up what looked like a disagreeable office. Unfortunately, owing to the favour in which sanitary matters are looked upon and discussed by the aristocracy and society in general, the name 'sanitary' is being employed where it does not apply; and thus we have plumbers calling themselves 'sanitary engineers,' &c. But it is quite certain that the name 'inspector of nuisances' will not be adopted only by those employed in carrying out the requirements of the Public Health and other sanitary Acts. In the Metropolis Management Act and Public Health Acts the office is designated 'inspector of nuisances,' and it has been used in all recent Acts and Orders of the Local Government Board. It must, however, not be forgotten that the word 'sanitary' is really the proper designation; and the work of an inspector includes much more than is implied in the name 'inspector of nuisances.'*

The growth of public opinion and knowledge in sanitary science is well illustrated on examining the various Acts of Parliament that have from time to time been passed. As early as the tenth year of the reign of our present Queen, a Public Health Act was passed, which was renewed in the year 1848, and in this Act a nuisance is defined as follows: 'Any dwelling-house or building in such a filthy or unwholesome condition as to be a nuisance and injurious to health; or that upon any premises there is any foul ditch, gutter, drain, privy, cesspool, or ashpit, or any foul ditch, gutter, drain, privy, or cesspool or ashpit kept or constructed so as to be a nuisance to or injurious to the health of any person; or that upon any such premises, being a building used wholly or in part as a dwelling-house, or being premises underneath any such building, any cattle or animals are or is so kept as to be a nuisance,' &c. In the year 1855 an Act for Nuisances Removal and Diseases Prevention Act Consolidation and Amendment was passed. This is really the basis of the present laws under which we act. In this Act the word 'nuisance' is more clearly defined than in the last Act mentioned. The word 'nuisance' means any premises in such a state as to be a nuisance or injurious to health; any pool, ditch, gutter, watercourse, privy, urinal, cesspool, drain, or ashpit, so foul as to be a nuisance or injurious to health; any animal so kept as to be a nuisance or injurious to health; any accumulation or deposit which is a nuisance or injurious to health. In the same year the Metropolis Local Management Act became law, including all the provisions of the above-named Act of Nuisances Removal. In this Act the duties of inspectors are still further increased to superintend and enforce the due execution of all duties to be performed by the scavengers, and also to report to the vestry or board the existence of any nuisance, &c. It is worth noting as a matter of history that in this Act the water-closet is first mentioned, and also that such shall be furnished with suitable water supply and water-supplying apparatus, &c. This marks the growth of improvement in sanitary appliances.

In 1866 the Acts were further amended, and the word 'nuisance' comprised any house or parts of a house so overcrowded as to be dangerous or prejudicial to the health of the inmates; any factories, workshops, work-places, not included in any general Act for the purpose, that were unclean or not ventilated in such a manner as to render harmless, as far as practicable, any gases, vapours, dust, or other impurities, generated in the course of the work carried on therein, or so overcrowded as to prejudice the health of the inmates. The term was made to include also any fireplace or chimney that does not, as far as practicable, consume its own smoke. In this Act power is also given to disinfect houses, clothing, &c.; and this shows another advance in sanitary science, viz., the importance of isolation and disinfecting to prevent the spread of contagious diseases. In the year 1875, in addition to the Sale of Food and Drugs Act, an Act of Parliament became law which, while not affecting the inhabitants of the metropolis, yet affects the interests of the inhabitants of the rest of England. The law relating to public health and local government was put into a simple and comprehensive form, and included regulations for the prevention of disease and nuisances, &c., and defined the duties of local authorities, officers, and the like. The definition of nuisances, as stated in the former Act referred to, is included in the Public Health Act, so that as regards the word 'nuisance,' it is the same over the whole country.*

The Local Government Board have clearly defined the duties of inspectors of nuisances in a circular sent to local authorities in the year 1873, and again in 1880; and an important provision was made in the Public Health Act of 1872, that the Government would, if the local authorities agreed, pay half the salaries of the medical officer of health and inspector of nuisances, provided the appointment and qualifications of the officers were approved of by them. This is satisfactory, as in the regulation for tenure of office it is stated that should the sanitary authority suspend any officer the cause of such suspension shall be reported to the Local Government Board, and if the Local Government Board remove the suspension of such officer by the sanitary authority, he shall forthwith resume the performance of his duties. I have gone a little into detail as to what the term 'nuisance' implies, and the legal duties of a sanitary authority as by law required; but, as I have pointed out, the various Acts of Parliament show stages of improvement and discovery in sanitation, and to-day we have much more to do and much more is required of us than in times past, as there have been many changes, and the requirements to-day are far more onerous than those of former years. Take one or two examples.

Years ago the system existed of open privies and cesspools, and it was found that the earth became impregnated with foul matter which contaminated the water supply, and gave off foul gases, causing disease. The then laws concerning nuisances consisted in merely seeing that the cesspools were emptied at such times of the day so as not to cause annoyance to the inhabitants; but since then the circumstances have changed. It has been thought that the proper way to deal with refuse was to convey it away by means of pipes, and it has been considered that as long as there was a pipe from the houses, and the refuse was hidden, that then there was an end of all trouble. It was not until about the time the Prince of Wales was attacked with typhoid fever that attention was drawn to the fact that in doing away with cesspools and privies, and in constructing sewers, a very serious danger arose from the presence in these drains or elongated cesspools of a much more potent agent of disease caused by the fermentation of the foul matter and the giving off of sewage gas. It has taken some time for this subject to be thought out by scientific men, and it is only within the last few years that public attention has been drawn to this subject and means taken to counteract the effect of it. The presence of diphtheria and the forms of typhoid fever is almost always a sure sign of an emanation of sewer gas, and the idea that it was only necessary to abolish the cesspool and connect the drains with the

* See on this subject SANITARY RECORD for June 1883, Vol. xiv., p. 554

* See SANITARY RECORD for July 1883 (Vol. xv., p. 12) for an exact legal definition of the term 'nuisance.'

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ver was till very recently deemed sufficient, and harm could accrue if only proper traps were used. as been found that very few traps are serviceable, y when there is a pressure on the sewer, as when s displaced by the inlet into the sewer of a heavy of rain the gas soon forces its way through the l of the trap, and thereby escapes into the house. ight stop here and inquire whether it is right that er gas should be caused; and I personally have ng opinions, derived from experiments and observa- de by myself, that there is no necessity for the in sewers of sewer gas, and I shall be prepared future time to show that the cause of this evil can prevented, and that the fact of its presence shows rong condition in the construction of our sewers. want to show is that it will not be enough to e strict letter of the law in the interpretation that nt when the draughtsman prepared the works, bservation steadily to apply the investigation of men in showing the causes of disease, to endea- all practical means to carry the knowledge into es. We must remember that the elements of re pure air, pure water, and pure food, and ig that hinders or adulterates any of these three is a source of danger to health. It is owing to ition in which men live and cluster together in illages, and elsewhere that the air becomes pol- means of foul air engendered by overcrowding, ventilation, emanations from the inhabitants es, foul smells or gases, arising from means for off the refuse, noxious trades, and accumulation nd dirt.

SMOKE ABATEMENT.

ter course of lectures at the Parkes Museum of , Margaret Street, Regent Street, was inaugurated h inst., when Mr. Ernest Hart delivered a lecture ke Abatement.'

ior Chandler Roberts, F.R.S., occupied the chair, oducing the lecturer, said that in the early days of n-engine it was recognised that the increased con- of coal would bring about serious evils, but, ed the state of London from the same cause, very ained effort had been made.

rnest Hart said the difficulty which the Smoke nt Institute had to contend against was that, erybody wished it well, very few were inclined to nuch. The only persons who were against the on principle were the chimney-sweeps, and the s against it on the ground of interest were market s, who feared a stoppage in the cheap supply of it it had been proved that an improvement in the ion of coal and a more extensive use of gas able sulphate of ammonia to be more largely used tivation of the land. This lecture was intended ous prelude to a considerable and continuous hich must be made, and for which the help e needed of the Parkes Museum and other nstitutions if any real progress was to be attained itement of smoke. After briefly giving a history empts made in this direction from the time of , when Parliament passed an Act prohibiting the l in the houses of the metropolis, Mr. Hart said be perceived that the present race of reformers pectable history and an honoured line of prede- The basis on which they claimed the help of all the people was the unpleasantness of smoke, and d prejudicial effect in the air on the health, the y organs being those on which the incidence of lence of that smoke chiefly fell. Mr. Hart, on , quoted a mass of statistics to show the enormous n the death-rate of London and other large and wns during certain periods of the year. Another hat every year the area on which it was possible flowers in London was being gradually driven beyond our urban circle. Then as to the cost of this smoke, Mr. Chadwick had stated that it added 1,000,000*l.* a year to the washing bill, and every householder would bear witness to the showers of blacks which came through open windows, destroying the decoration and furniture of our houses. The coal nuisance had even debased and degraded our ideas of ornamentation in London, and destroyed a large part of the beauty and appearance of our houses—and it had led us to assume that to evade, not to escape from, the consequences of this dirt we must necessarily use dark papers, oak-grained doors, and generally to live in dark and dirty coloured apartments, because they were least likely to show the dirt which fell upon them. The injury done by smoke particles to the surface of the Houses of Parliament was estimated by Mr. Shaw Lefevre at 2,500*l.* a year; whilst from the same cause the surface of Westminster Abbey was in a state of so much decay that a great national effort would shortly have to be put forward in order to in some measure repair the damage. Beyond this the waste of coal, the waste of labour, and the cost of hauling the waste, the expenditure on street cleansing, and the additional labour involved in private houses, were almost incalculable. If people would read the reports of the Smoke Abatement Institute they would see which grates were the least efficient and the most smoky, which were the coals which had the least evaporative value and which had the most evaporative value. The manufacturers whose chimneys produced the most evil were bakers, brewers, builders, chemical works, confectioners, iron and brass founders, laundries, leather dressers, oil workers, potters, printers, saw-mills, smiths, steamboats, and tanners. Every one of these trades could be carried on without the production of any smoke whatever and without interference with the economical carrying out of their businesses. For the remedy of this state of things the Institute looked, in private houses, to the use of improved grates, but the ultimate line of progress would be the abolition of the use of crude coal in open grates and stoves, and the introduction of the use of the gaseous fuel derivable from coal. As to manufactories, both in Lambeth, the East-end, and the provinces, some owners had adopted smoke-consuming apparatus with great financial benefit to themselves. These facts would greatly help the Institute in proceeding against offenders, but what they wanted, above all things, was to carry the industrial classes with them, and show the advantages of taking the course which the Institute recommended. Mr. Hart urged householders to adopt a system of under-feeding for kitcheners, and to burn in the other grates a mixture of coal and gas coke broken into small pieces, having the sides and backs of the open grates made of fire-clay, and not iron. In conclusion, he stated that what the Institute aimed at was the appointment of a Royal Commission, so as to collect all the available knowledge on the question and apply that knowledge in abolishing smoke, not only in London, but in provincial towns. The Parkes Museum were considering a proposal to allow the Smoke Abatement Institute to exhibit a typical series of smoke-abating grates and appliances, and in the exhibition which will be held next year at South Kensington the ventilation of houses and the abatement of smoke would be an important section. They also wanted to give the local authorities in London increased and more extensive powers to deal with the difficulty; but, above all, they wished to educate public opinion, for that was the only true means of bringing about a better state of things.

After a short discussion, a resolution was passed, on the motion of the chairman, seconded by Mr. W. White, F.S.A., cordially thanking Mr. Hart for his paper.

The Council of the National Smoke Abatement Institution met at 44 Berners Street, on the 8th inst., to consider the resolution proposed at the Mansion House by the Duke of Northumberland, and seconded by Sir William Siemens:—'That the period has now arrived at which systematic inquiry is desirable into the application of the resources of technical science for the abatement of smoke,

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now largely produced in industrial processes and in the heating of houses, as well as into the operation of the existing laws for smoke abatement and that the Council of the National Smoke Abatement Institution be requested to urge upon the Government the desirability of appointing a Royal Commission for the purpose.' It was decided to comply with the request contained in the resolution, and a committee of the Council was appointed to take the necessary steps. A proposition to arrange with the Council of the Parkes Museum for space to exhibit smoke-abating appliances at that institution was considered and adopted subject to conditions being agreed. The general report on the tests made by the institution since the last meeting was presented, together with detailed statements and tables, prepared by the engineer, for future publication.

ANTHRACITE COAL AND SMOKE ABATEMENT.

AT the present moment we have at our command two sound and reliable agents, which, if used by every householder in London, would do much to prevent the production of smoke. These agents are gaseous fuel and anthracite coal. As the effects of the former are well known, and as this article is written to show the availability of anthracite coal, it will be restricted to an account of its capabilities and advantages under existing circumstances. Admitting that anthracite coal is rather more difficult to light than the bituminous variety, and that grates with a quicker draught are more suitable to its use, it is nevertheless a fact, that in the district in South Wales, around which it is raised, it is commonly used both by the working classes and others above them in the social scale in grates of the most ordinary construction, and with the most satisfactory results. The writer has recently returned from a visit to that portion of the South Wales Coal Field where the fine veins of anthracite exist, and has seen fires in different classes of houses burning in different kinds of grates, none of which, however, possess any special facilities for burning this coal; old-fashioned grates, with the fire-basket a foot or more from the hearth, and others in which it is only a few inches from it. In all these were found bright and cheerful fires, giving out great heat, clean hearths (for it is notorious that anthracite coal produces but a mere minimum of ash), and, above all, *an entire absence of smoke*. Leaving the working classes out of the question altogether, and confining his remarks to those who have to depend upon servants for making their fires, the writer was careful in instituting inquiries to endeavour to find out if any additional assistance was at the command of the domestic when lighting her fires, but found that the usual addenda of paper and wood were the only ones employed. It was admitted that sometimes when a change of servants occurred, and a new one that had not been accustomed to anthracite was engaged, she experienced a little difficulty at first in dealing with the 'stone' coal, but with a few instructions she soon became mistress of her work, and satisfied with the results, which gave her less labour day by day in clearing up ash and dirt. This clearly shows that the burning of anthracite with successful results depends entirely upon those who have to light the fires, for once lit they require but little attention, certainly not nearly so much as those made with bituminous coal, and when it is distinctly asserted that cheerful fires cannot be obtained with anthracite coal, the writer is thoroughly convinced from what he has seen and heard that the fault lies with the servant and not with the coal. It is doubtless true that there are different qualities of anthracite as with most other things, and the writer would qualify his remarks to this extent, that his observations extended mainly to the finest description of it, viz., the 'Big vein' of the Garnant colliery, situate in the Cwmamman valley, on the borders of Glamorgan and Carmarthenshire.

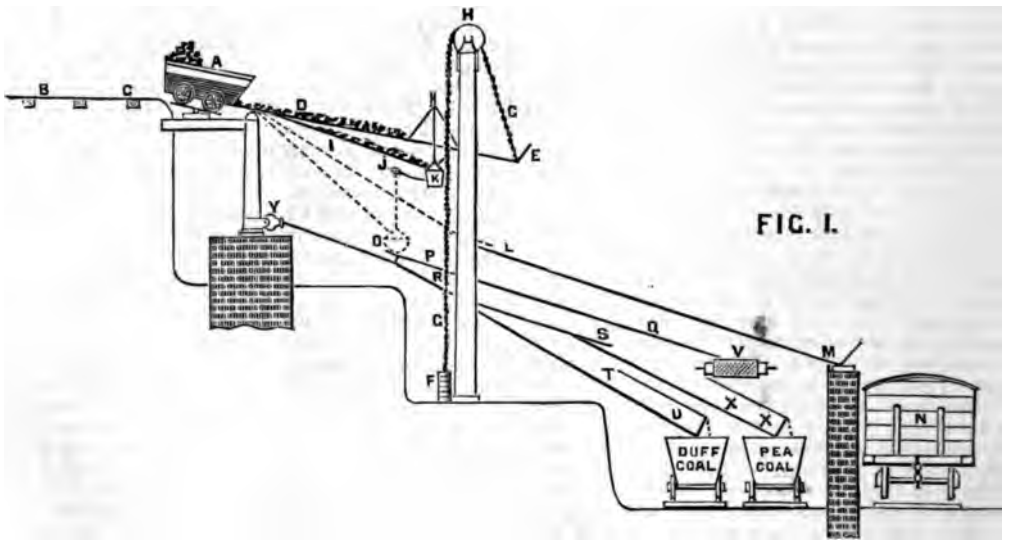

FIG. I.

The 'tram' of coal (A) is brought from the pit along the tramroad (B C), then tipped as shown in the sketch, the screen (D E) being brought into the position shown by the weights (F) acting through the chain (G G) over the pulley (H). The weights are heavier than the screen, so that when empty the screen is lifted by them. When the coals are let on to the screen the screen and coals are heavier, and so the weights are lifted and the screen is lowered: this action is controlled by a brake attached to the shaft of the pulley (H). To avoid confusion this gearing is omitted from the sketch. After the tram has been emptied on to the screen, the bars on this screen are 1½ inches apart; and all the smaller portions of the coal have fallen through into the shoot (I J), and thence into the box (K). The screen is lowered, and the large coal is allowed to pass on to the shoot (L M), and from this after cleaning into the railway truck (N). When the main spring is thus lowered, the box (K) descends to the position (O), shown in dotted lines; and by an arrangement of rods—not shown in the sketch—it is emptied on to the swinging screen (P Q); this is made of steel wire with holes 1 inch square; beneath this another screen is attached with holes ½-inch square, and under this latter is a shoot (T U); the 1-inch screen (P Q) delivers on to a band (V) working on rollers; the ½-inch screen into a shoot (X X), and what passes through this ½-inch screen by the shoot (T U) into a tram marked 'duff coal'—and the shoot X X into another tram marked 'pea coal.' To the upper end of the two screens a couple of rods are attached, and so by means of eccentrics to which the rods are also attached, worked from a small vertical engine (Z) through the shaft Y, shown in fig. 2, these 1-inch and ½-inch screens are kept rocking, and the coal as it is delivered from the box K on to them is passed forward, free from dust.

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This coal can be burnt in ordinary grates; but, since the smoke abatement question has been raised, others have been introduced specially constructed for the purpose, and amongst these we may mention the 'Kyrle' grate of the Coalbrookdale Co., Messrs. Brown & Green's 'Gold Medal' grates, the 'Kaio Kapnos' of Messrs. Clarke, Bunnett & Co., and Crane's patent, made by Messrs. Deane & Co., London Bridge, as having proved excellent appliances for burning this coal; in fact, the fires made in these grates have never been surpassed for brilliancy or heat-giving power with any coal. Recently, the introduction of Wery's atmospheric cowl for domestic grates by Messrs. Livet & Co., described and illustrated at p. 277, enables anthracite coal to be burnt in ordinary constructed open grates with perfect freedom. But exception has been taken by many to the use of anthracite, owing to its extreme hardness and the difficulty of breaking it with the small coal-hammers usually found in dwelling-houses. This difficulty has now been overcome by the Garnant Colliery Company, who have erected machinery by which coal of any size can be sent out requiring no after-breaking whatever. On the occasion of our visit to the colliery the writer had an opportunity of witnessing the *modus operandi*, and, as the invention is most ingenious and perfect in its arrangements, illustrations of it are appended, the drawings showing, in addition, the usual machinery at the mouth of a coal-pit for discharging the fuel into the trucks. (Figs. 1 and 2.)

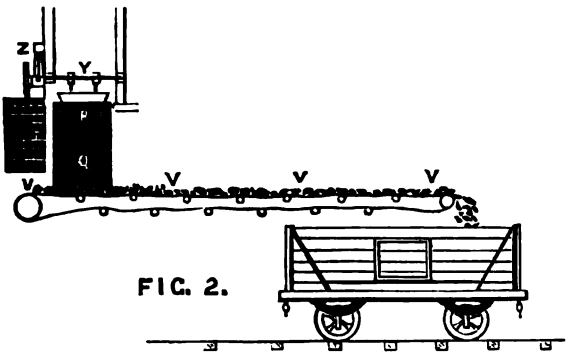


FIG. 2.

The band v, fig. 2, is 2 feet 6 inches wide and 56 feet long; and is kept moving forward by gearing from the small vertical engine. The nut-coal—*i.e.* the coal that comes through the larger oscillating screen, and that is adapted for domestic use, is delivered into the railway waggon as shown. The 1-inch and ½-inch screens can be changed to any other dimensions to meet demands, so that coal of any required size can be delivered to order.

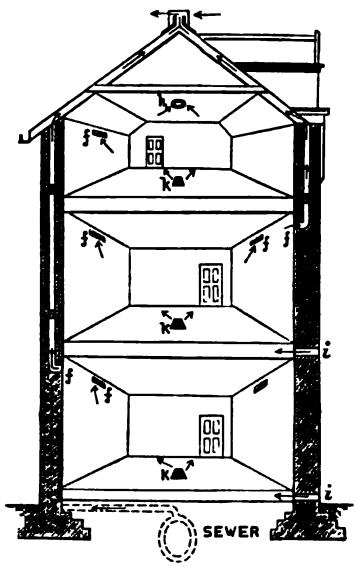
It will thus be seen from these arrangements that the Garnant Anthracite can be delivered for house use ready to put into the grate without the necessity of a hammer touching it, which not only saves labour to the servant, but facilitates the making of the fire. As regards the quality of this coal, the 'Big Vein,' or four feet seam, is well known to be the finest specimen of anthracite yet found, and it is stated upon the authority of one of the first mining engineers and colliery viewers that it is extremely rare to find a seam of any kind of coal so free from foreign substances as this. The writer descended the pit and went through the workings, to find that only this seam was being utilised, other veins above it of a slightly inferior quality being for the present left untouched. So far as quantity is concerned, there appears to be no fear of the supply falling short even with a very large demand, and as it is generally propounded that one ton of fine anthracite will go as far as three tons of bituminous coal, the advantages as regards economy are decidedly on the side of the user. Those conversant with the tests at the Smoke Abatement Exhibition may recollect it was this coal that was mainly used for the domestic grates shown there, and it is spoken of in high terms in the report.

One step, however, is yet wanting on the part of this or other anthracite coal companies if they wish to utilise to the utmost the valuable properties in their possession, beyond the small impetus given to the sale of the coal through the efforts of the Smoke Abatement Institution. It is mainly used throughout the country for the drying of malt, the fact of its being nearly all pure carbon, its freedom from sulphur, and the small quantity of ash it contains being greatly in its favour for this process. The Garnant Company alone send off large quantities day by day to maltsters in different parts of the kingdom; but, if it is to become a domestic agent to any extent, it must be brought to the door of the consumer; in other words we must be able to obtain it of any coal merchant, and be satisfied that we get the right sort, as we now do our bituminous coal. At present, Mr. Whiteley's, of Westbourne Grove, is the only house from whom the Garnant Company's coal can be obtained in small quantities—that is to say, by the ton, though any coal merchant, or the company themselves, will supply it direct by the truck of seven or eight tons; though it is stated that, before long, arrangements will be made with certain coal merchants in the metropolis to stock it. If anthracite coal can be burnt in South Wales it can be burnt in London and elsewhere, and with such a simple means of preventing smoke, without disturbing existing fire-places, somewhat within reach, it will indeed to be regretted if the Garnant Company do not complete the work they have already begun by enabling the public to obtain it readily all over London in the manner above suggested.

ILLUSTRATED SANITARY PATENTS.

ENGLISH.

5876. (1882.) IMPROVEMENTS IN THE METHOD OF AND MEANS FOR VENTILATING BUILDINGS: T. H. THOMPSON, ENGINEER, MANCHESTER. [6*d.*]—The cut



represents a building in vertical section, and illustrates the application of the improved tiles in the ventilating of rooms. Here three rooms are represented as being ventilated by means of the improved ridge tiles. The vitiated air from the two lower rooms escapes through grids or openings, *f f*, into flues, *g g*, which are in communication with the roof space. The air from the upper rooms passes through openings *k* in the ceiling directly into the roof space. The vitiated air passes out from the roof space

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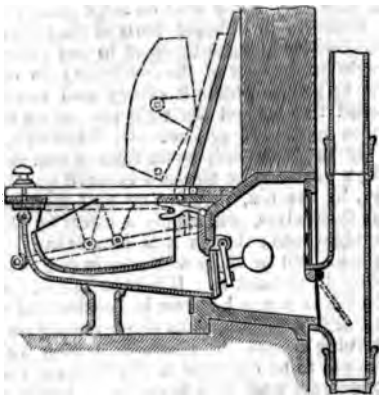
through the openings in the ridge tiles. Inlet passages, *i i*, for fresh air communicate with grids, *k k*, in the floors, or fresh air is otherwise admitted by suitable means.

6049. (1882.) WATER-CLOSET IMPROVEMENTS: R. L. LEASK, C.E., DUBLIN. [6*d*.]—The engraving exhibits a vertical section of this improved apparatus. This patent

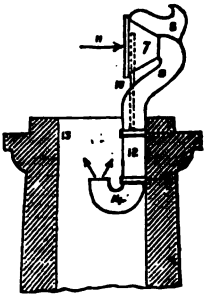


consists in the employment of a tilting basin which is combined with the handle, water supply, and discharge mechanism, and which is emptied by being tilted when the handle is pulled up. The apparatus is by preference fitted close to the inner side of an outer wall of a building, and the tilting basin is placed within an outer shell or basin, the bottom of which is inclined downwards, and is formed with a discharge outlet leading into a discharge passage formed through the wall. The discharge passage is formed in a box, and which is made with a grating at the outside of the wall and below the grating with an outlet communicating directly with the soil-pipe, this outlet being fitted with a loose flap valve. The box in the wall forms an air chamber, which is interposed between the external soil-pipe and the water-closet, and which prevents the passage of gases from the soil-pipe into the house. Within the air-box there is a valve arranged to close against the outlet of the outer shell of the closet. The lever connected to the closet handle is also acted upon by a weight or spring which, when the handle is let go, returns the parts to their position of rest, and causes the valve in the air-box to be closed against the outlet of the closet shell. The tilting basin is centered on trunnions, and is tilted by means of a pin formed upon it. There is a certain space between the prongs of the forked lever in consequence of which the lever moves to some extent before tilting the basin, and the valve at the discharge outlet of the outer shell or basin is well open when the basin begins to discharge its contents. In tilting, the back of the basin turns down towards the outlet, and rapidly empties its contents towards the outlet. The lever connected to the closet handle is also connected to the water-supply apparatus.

220. (1883). CHIMNEY COWLS AND VENTILATORS: G. DAVIS, Aberystwith; W. JONES, Llannon, same county; and R. GIRDWOOD, Edinburgh. [6*d*.]

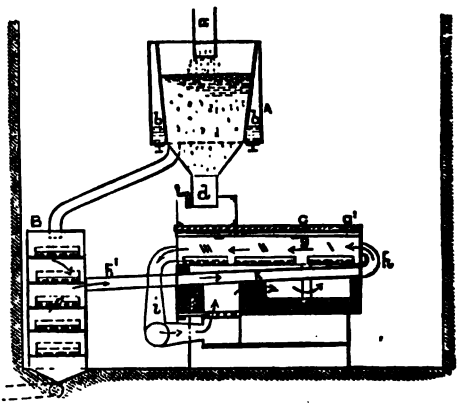
This invention has for its object to improve the construction and action of chimney cowls and ventilators; and consists principally in taking advantage of external currents of air by means of rotating or fixed cowls or inducting hoods or funnels, placed outside of any building from the interior of which smoke, gases, or air, is to be removed.

In the cut is shown one modification of this patent, and here a conical mouth or funnel, 7, made of sheet metal and with a vane, 8, and curved tube, 9, forms a movable piece or cowl which can turn about a vertical spindle, 10, partly indicated by dotted lines. The position of the vane, 8, and the placing the larger portion of the cowl to one side of the spindle, 10, cause the cowl to turn so as always to have the mouth of its funnel, 7, facing the wind, the direction of which is indicated by the arrow, 11. The curved pipe, 9, of the cowl or movable piece communicates with a pipe, 12, fixed inside the chimney, 13,



and having its bottom bended or curved so that its end, 14, is directed upwards, and the pipe, 12, 14, acts as an inverted siphon. The air entering the funnel, 7, issues in an upward jet from the siphon, 14, and acts on the smoke or gas passing up the chimney, 13, in a manner to propel it outwards, and promote the draught.

272. (1883.) APPARATUS FOR THE TREATMENT OF FÆCAL MATTERS: MESSRS. VON NAWROCKI, BERLIN. [6*d*.]—This invention has for its object to separate the liquid from the solid or semi-solid parts, and to dry the latter at or near the place of production. The woodcut shows a vertical section of the apparatus.



The apparatus comprises a collector A, a filter B, and a furnace C. The collector is composed of two concentric vessels, the inner one of which is perforated to allow the liquid to pass into the annular space *b* formed between the two vessels, while the solid portion remains and is periodically discharged in the furnace through a vertical tube *d* provided with a lid or valve. The liquid is conducted through the pipe *i* into the hermetically closed filtering vessel B and passes successively through the several superposed filters containing powdered peat or other material which serves to abstract ammonia and salts from the urine, so that the latter may escape through the pipe *e* in the shape of pure water. The solid parts pass through the pipe *a* into collector A, and are conducted into the pans I, II, III, which can be exchanged and serve to extract the last particles of liquid contained in the solid parts. The furnace is separated into two parts by a horizontal partition. The upper part receives the matters which have to be dried and is closed by a double cover *g g*¹. The lower part contains the fireplace and the flues and is traversed by the pipe *h*. The working of this apparatus is as follows: As soon as a sufficient quantity of fæcal matters have accumulated in the collector A, a fire is lighted in the furnace in order to produce ventilation; then the pans I, II, III, are filled successively by the pipe *d*, and the furnace is

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ed by means of the cover *g*. Consequently a current ir passes in the direction shown by the arrows, so that ind gases from the filter are sucked through the pipe *h*¹, le through the pipe *h* fresh air is admitted over the into the drying-chamber, from where it is led for the ose of combustion through the pipe *i* underneath the e, carrying away the gases and humidity produced by oration.

52. (1883.) IMPROVEMENTS IN THE METHOD OF APPARATUS FOR INDICATING THE PRESENCE OR ENCE OF WATER IN CISTERNS OR OTHER VESSELS ONNECTION WITH BATHS AND OTHER WATER AP-ATUSES: T. SHAW AND F. MILAN, ENGINEERS, DDERSFIELD. [6*d*.]

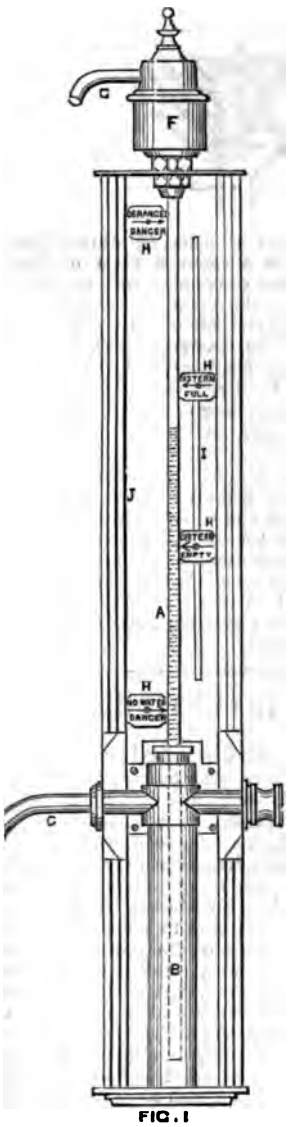


FIG. 1

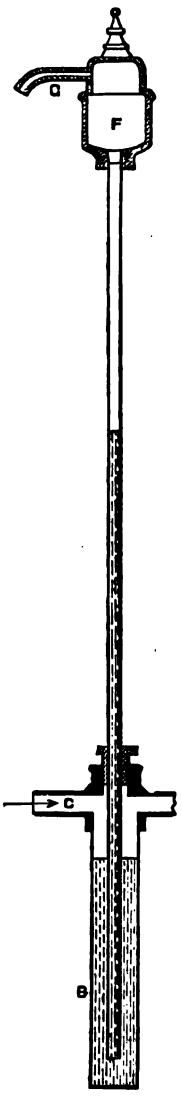


FIG 2

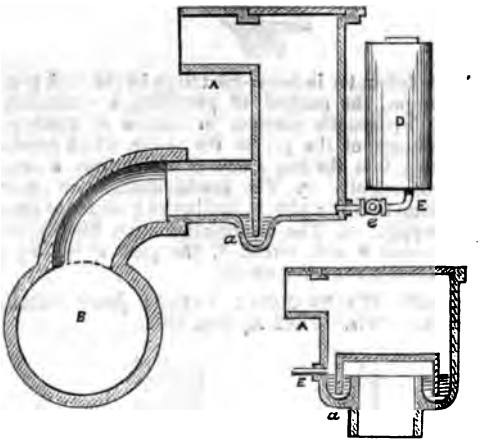
or this purpose is employed an arrangement of tubes aining mercury or other fluid, as shown in fig. 1, ch is an elevation of the apparatus. A is a glass tube plied with mercury from an outer tube B shown in ion at fig. 2. C is a pipe which is in communication either pipes, boiler, or cistern. On the top of the A is a cup or receiver F, so that if the pipes between er and cistern were stopped up by frost or other cause the pressure of water in the boiler would be so great as to force the mercury into the said cup and allow the water to escape, thus relieving the pressure, and preventing an explosion. To the cup F is attached a pipe G, which, if necessary, may be conveyed to the fire, so that water escaping therefrom would extinguish the fire. As the cisterns or water apparatus are placed at different heights, and consequently have different pressures, adjustable tablets, H, can be slided up and down the groove I and adjusted to suit the various pressures.

The action of the apparatus is as follows. The tubes and parts in immediate connection therewith are placed into a framework J and attached to the wall, and connected by pipes C to, say, the boiler or flow pipes usually at the back of a kitchen in houses, or to the boiler or pipes in connection with hot water-heating apparatus. When the cistern which supplies the boiler is full, or nearly full, the mercury will rise up the tube as shown in dotted line, but if the cistern was empty the pressure of the water would be less, consequently the mercury would fall as low as the tablet which indicates an empty cistern; so far, however, there is no fear of immediate danger, but should the pipes between cistern and boiler be empty also the mercury would still lower until all of it was in the tube B, indicating no water. If there was no water in neither the cistern nor pipes steam would be generated in the boiler as previously described, whereby a greater pressure would operate on the mercury and force it up into the cup F, allowing the steam to escape, which may be employed to sound a whistle placed in the cup F. Electric wires may be placed in the tube, so that when the mercury reached a dangerous height by pressure the electric circuit would be completed, and alarm bells rung.

AMERICAN.

274, 465. SEWER INLET. EDWARD Z. COLLINS, CAMDEN, N.J., and CHARLES F. PIKE, PHILADELPHIA, Pa. Filed August 10, 1882.

A tank holding disinfecting material and a pipe-connection between it and the sewer-trap, whereby a seal of the disinfectant may be provided.



Claim.—1. A sewer-inlet provided with a seal, and means for passing a stream or flow of disinfecting fluid to said parts. 2. A sewer-inlet provided with a trap, in combination with a tank for holding a disinfectant, and a pipe of connection between said inlet and tank. 3. The combination of inlet A, provided with a trap *a*, sewer B, reservoir D, and pipe-connection E, between said reservoir and inlet. 4. The combination of inlet A, having trap *a*, the reservoir D, adapted to form a disinfectant-holding chamber, and a pipe E, having a valve *e*, for regulating the flow of disinfecting liquid to the inlet. 5. The combination of the inlet A, having trap *a*, and valved pipe E.

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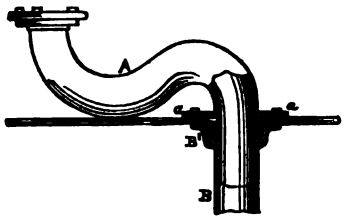
274, 434. PIPE JOINT PACKING. COTTER T. BRIDE, WASHINGTON, D.C. Filed November 27, 1882.

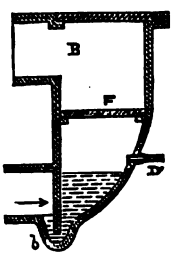


Claim.—In a joint made to connect water-closet or other similar pipes to soil pipes, the combination, with the pipe A, having a flange, *a*, and the pipe B, having the bell top B', of the interposed elastic packing having upright flaring walls, and a horizontal flange at the top, whereby a tight joint is made both against the upright walls and against the horizontal top.

274, 466. SEWER INLET. EDWARD Z. COLLINS, CAMDEN, N.J., and CHARLES F. PIKE, PHILADELPHIA, Pa. Filed August 10, 1882.

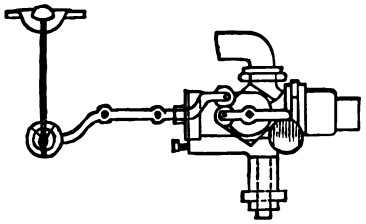
A pipe from a water main opens into the sewer-trap for supplying a continuous flow of water thereto. Also, the back pressure of the gas is opposed or balanced by a constantly increasing pressure of the column of water in the trap when the mouth of the sewer is closed by the rising tide.

Claim.—1. A sewer inlet provided with a trap and a pipe leading to a water main or other constant source of supply, whereby a continuous flow of water is passed to the trap of the inlet. 2. In preventing the displacement



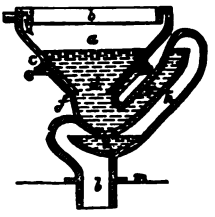
of the sealing water in sewer-inlet traps by the back pressure of sewer-gas, the method of providing a constantly increasing hydrostatic pressure to oppose or balance the back pressure of the gas in the sewer, which consists of conducting into the trap a flow of water from a constant source of supply. 3. The combination, with inlet B, having trap *b* of the pipe D, leading to a source of constant water supply. 4. The combination, with inlet B, having partition-trap *b* and screen F, the pipe D leading to a source of constant water supply.

274,628. WATER-CLOSET VALVE: JOHN MCGUIRE, Milwaukee, Wis. Filed April 4, 1882.



Claim.—1. The valve-casting having seat and tapering collar, the tapering box, having packing and screw-cap, having interior rim, in combination with the shaft, extending from the seat entirely through the valve-chamber, box, and screw-cap, and having flange bearing against the end of box. 2. In combination with shaft, the weighted lever, carrying a wheel on its short arm, and the water-closet lever having a wheel on its arm adjacent to the short arm of lever. 3. In combination with the valve-casting having longitudinal valve-chamber, and the chambered and apertured casting and its perforated screw-plug all communicating therewith, the valve having concaves and cup-leather valve. 4. In combination with the casting, having longitudinal valve-chamber, the valve, fitting snugly within the valve-chamber, and having an interior rack and concaves, to permit free water-passage, and the cog segment and shaft, independent tapered box, and screw-cap, through which said shaft passes, and suitable packing.

274,644. WATER-CLOSET: ANDREW G. MYERS, New York, N.Y. Filed Nov. 10, 1881.



Claim.—1. A separate or detached water-closet base adapted to combine with a common basin or hopper to form a siphon water-closet constructed with the mouth and shoulders *e f* to receive the basin, the siphon legs *g h*, adapted to rise up along one side of the basin and return below the same, with the discharge-neck *l* in line with the necessary neck *d*, or nearly so, and the base or rim *m*. 2. A siphon-base for water-closets, basins or hoppers, formed with the mouth *f* to receive the basin, the neck *l* to connect with the sewer pipe, and the intermediate swell, *i*, with the siphon *g h*, extending from the mouth to the swell, and pocket *k*, terminating the siphon in the swell. 3. As a new article of plumbers' ware, a water-closet siphon base formed with a mouth and shoulder on the top to connect with a basin, siphon legs *g h*, rising above the said mouth and returning down below the same, and terminating with the discharge-neck *l*, to connect with the sewer, and all formed in one piece or structure, and adapted to combine with a common basin to form an improved siphon water-closet.

NEW INVENTIONS.

AN AMERICAN SMOKELESS FURNACE.

THE Medart Patent Pulley Company, St. Louis, U.S.A., have in operation at their new works a novel and economical smokeless furnace. It is self-feeding, and especially adapted to the use of fine or slack coal. The construction of the furnace is described in the *Age of Steel*. It has on either side a bunker, or magazine, into which the slack or broken coal is introduced. The bottoms of the bunkers are sharply inclined to correspond with the inclination of the grate bars of the furnace, and, by the working of outside machinery, form in connection with such bars, every now and then, two continuous and inclined planes, down which the coal moves from either bunker by force of gravity towards the centre of the furnace. To prevent the crowding of coal on the fire, the bottom of each bunker is provided with an inverted box, called a 'stoker box,' which moves up at regular intervals to the side of the bunker next to the fire, cutting off the movement of the coal towards the grate bars of the furnace. This box is moved by machinery attached to the front end of the furnace, and, when drawn back forms, in connection with the inclined bottom of the bunker and the grate bars of the furnace, the plane down which the coal moves to the centre of the furnace. The furnace is arched over to prevent the flames and intense heat from coming in direct contact with the boiler. The air is admitted in

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front of the furnace, the supply being regulated by a damper, passes up through a flue in the brick wall, then over the arch, and there takes up the heat from the brickwork, passes down through little openings, and gives to the fresh fuel on the coking plate its supply of air. It is hot enough itself to ignite any gases evolved; consequently immediate combustion takes place, and no smoke is made. By the time the coal reaches the grate, the bituminous part is consumed, and what remains is coke. This gets its needed supply of air through the grates. A very small engine is attached to the side of the furnace, and to this is attached a bar running across the front of the furnace. This bar is connected by links to arms which move the stoking apparatus and shake the grate bars. The clinker breaker at the centre or bottom part of the furnace is worked by a wrench from the outside. The company working the furnace estimate their economy in the value of fuel consumed at from 90 dols. to 150 dols. per month, according to the quality of coal used.

THE BLACKMAN AIR PROPELLER.

AMONGST the many ventilators now before us the Blackman Air Propeller must not be overlooked. Of American invention, it had only been exhibited here a short time before it attracted the attention of several influential persons, the result being that the patentee disposed of the whole of his foreign patents to a company that has been formed in England. The invention is of simple character, and as the illustration shows consists solely of a circular fan, uncased, with blades of peculiar formation. Originally intended by its inventor for use in certain manufacturing processes, or for mills, factories, or other places, where dust, smoke, or foul gases

require to be expelled or the atmosphere of a building constantly changed, the company who have acquired the patents have already commenced to introduce it for other and more general purposes. One of them, we are informed, is being supplied to His Grace the Duke of Sutherland for Dunrobin Castle, where the same electric current will be used to supply air by means of this propeller as will supply light by means of incandescent lamps. The mechanical merits of the propeller consist in the formation and arrangement of the blades and in its lightness and simplicity. The whole of one side of the wheel is delivery surface, and the feed or supply surface is much larger, being made up of the whole area of the other side of the wheel, and also of a large area around the periphery, where, from the novel and peculiar shape of the blades, a large proportion of the air is admitted or drawn in. A propeller of 48-inch diameter, the size hitherto most largely made, has thus over 12 square feet of delivery surface and over 20 square feet for supply. This ventilator is equally adapted for exhaust or inlet purposes, and can be fixed either horizontally or vertically, and has already been found of great use in many processes. For instance, in the drying of malt the propeller is capable of forcing large volumes of air through it with any amount of rapidity without the necessity of moving it by mechanical disturbance. In mills and factories where dust and particles are constantly given off by the work that is being carried on, one of the propellers fixed in a horizontal position in connection with a shaft carried outside the roof, will quickly render the atmosphere clear and wholesome, the mere opening of a window supplying the fresh air without the addition of specially contrived inlet ventilators. In schools it seems to provide the easiest and most rapid means of rendering the atmosphere pure, and there is no necessity for the existence of draughts if the inlets are arranged to suit the amount of air withdrawn. In fact the proper ventilation of such an apartment is reduced to a mere arithmetical problem. Given a certain area, the volume of air it contains is easily arrived at, and as it can as readily be found what quantity the propeller displaces at a given speed, so can the supply of fresh air be regulated. It will be seen that there is a wide difference between the Blackman propeller and all other kinds of fans enclosed in cases, which necessarily present but a small feed and delivery surface. Referring again to the intentions of the company to introduce their ventilators for domestic purposes, the increase that may be expected in the development of electricity and the introduction of batteries and dynamo-machines of small power will materially aid them in this direction. For further illustration of the air propeller, a visit to the company's premises at 46 Holborn Viaduct is recommended, where visitors will be enabled to make themselves acquainted with the various means in which it may be applied as a 'power' ventilator. The Blackman Air Propeller is the simplest and apparently the most effective with which we are acquainted.

THE 'WERY' ATMOSPHERIC COWL.

IT will be remembered by many of our readers that at the Smoke Abatement Exhibition at South Kensington the Livet boiler (Messrs. Livet & Co., Short Street, Finsbury) was selected as the testing apparatus for the great bulk of the fuels that underwent that ordeal, on account of the superior features apparent in its arrangements. In connection with this boiler, which has been fully described in the columns of the SANITARY RECORD, the 'Wery' Cowl was considered of such importance that it was illustrated in the pages of the Smoke Abatement Report. Up to this time it had only been used in connection with steam boiler appliances, but later on it occurred to Messrs. Livet & Co. that the invention should be as advantageous for domestic uses, as it had proved in those for which it was originally intended. A gentleman connected with the company having a chimney that was a notorious 'smoker,' and that had baffled all attempts to 'cure' it, a cowl on the 'Wery' principle, adapted to a domestic grate, was made, and fixed on the delinquent. The effect of the new cowl has exceeded the most sanguine expectations of the proprietors, and this chimney, hitherto so incorrigible, is now perfectly free from smoke, and the fire burns with the most perfect freedom. This fact may be ascertained by anyone who feels interested in the question upon application at the company's offices, 2 Short Street, Finsbury Pavement. Attempts were then made to burn anthracite coal in the grate, a common, old-fashioned open kitchen range, and these efforts have succeeded equally well. Since then the cowls have been fixed in various places with the same satisfactory results; in some instances they have been applied to chimneys in which slow combustion grates are fixed, causing them to burn much more freely, without a sensible increase in the consumption of coal. At the office of the Livet Company in Finsbury this fuel is being daily burnt by the assistance of the Wery cowl with the greatest success in a grate the least adapted for anthracite coal, and it is within the knowledge of the writer that

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this chimney was a very bad example of the smoky class before the alteration was made. The peculiar feature of this appliance, of which an illustration is appended, is a double body or concentric cylinders half-way up, the outer one being open at the bottom, but enclosed at the top. In the inner one are two spiral worms, starting at the bottom from opposite points, and consequently crossing each other at intervals. These worms are open, the inner orifice being smaller than the outer. The cold external air, entering the outer jacket, becomes heated in its contact with the inner portion in its passage up the spiral worms, and expands when meeting the heated gases ascending the flue, causing a displacement in the cowl which is being continually refilled by the fresh supply from below. This action, being constantly repeated, forms a steady upward current in the chimney flue, and effectually prevents all down draught. There is no mechanism to get out of order, or nothing to interfere with the sweeping of the chimney. The most recent application of the invention is for the automatic ventilation of buildings, which will be described on a future occasion.

A PATENT DOMESTIC FIRE-ESCAPE.

Mr. Nobes, of 27 Harrow Road, W., has patented a new domestic fire-escape, consisting of a fireproof rope-ladder, which, when not in use, is coiled around a roller in a box resembling a cabinet or similar piece of furniture, and which is no disfigurement to the room. To put it in operation the box is brought close to the window, though it is obvious that where practicable it should always be in this position, and the lid, which is a folding one, and fitted on the inside with rollers, is thrown back and rests on the window-sill.

The end of the ladder is then drawn out, and slides easily over these rollers, and, as an additional advantage, small wheels are attached to the treads of the ladder, which have the combined effect of keeping it from swaying and of giving a safe foot and hand hold. By means of a handle attached to the roller inside the box, to which the end of the ladder is fastened, it can be easily raised and lowered, so that an entire household could be rescued from one window alone before fire-escapes or other help had arrived.

The ropes of the ladder—the treads being of iron—are made fireproof by being saturated with the best-known and only effectual fireproof solution, and are made in various lengths to suit the requirements of cottages or the lofty buildings of public institutions, mansions, &c. It has been brought under the notice of the police authorities and officers of the Fire Brigade, all of whom have expressed great satisfaction with it on account of its simple and effective manipulation, and we believe they intend recommending its general adoption. If this were done, it would undoubtedly be the means of saving many lives that are annually lost from want of timely and efficient means of escaping from burning houses and other buildings.

NICHOLLS' PATENT SANITARY DEODORISING APPARATUS.

The apparatus bearing this title is hardly yet before the sanitary public, but it has been granted letters patent; and its principles have been practically carried out, so that we may fairly judge of its merits from an opportunity which has recently been afforded for its inspection. The system of earth closets, upon which the invention is based, is well known; and the number of new makers that have entered into this trade clearly shows that the demand is increasing.

The objection, however, of discharging or cleansing these closets has hitherto been somewhat of a drawback (probably the only one) to their use, by those living in the heart of thickly populated towns. This objection Mr. Nicholls has overcome, one of which is the fundamental principles of the system. The object is to reduce the fæces by heat into such a condition that they may be removed in the shape of a dry manure without giving off any objectionable effluvia, as all the volatile gases are fixed by the process of baking in the apparatus.

In the following sketches fig. 1 is a large and strong

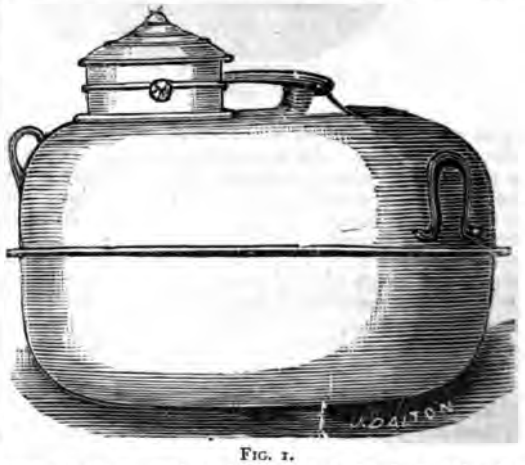

Fig. 1.

copper retainer, with an independent disinfecting chamber lifting on and off the top. Fig. 2 shows it complete with

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wood casing, lid down, and disinfecting chamber projecting, which by means of a hinge is swung backwards before using, and when returned to its place afterwards the disinfectant or deodoriser is released by the swinging action through perforations into the container below.

When it is required to discharge the contents of the apparatus it is removed from fig. 2 to fig. 1, and placed over the furnace fig. 3. The contents are then treated by heat for about two hours, at the end of which time they are resolved into their constituent elements without any vapours being passed into the atmosphere, save and except water as vapour, the gases ascending into the deodorising chamber previously filled with soot or other carbonaceous matter, which absorbs and fixes them, giving as a result the essence of manure, which, when mixed with the ash or residue of dry solids in the container, forms a rich fertiliser equivalent to twenty times its weight of well matured farmyard manure.

It is not, however, absolutely necessary as a sanitary precaution to subject them to heat for so long a period as that mentioned, as specimens shown us that had only been baked for fifteen minutes had evaporated nearly all the water, and fixed the ammonia and other gases, rendering it quite free from any emanations whatever, so that it could be removed without causing any nuisance. It is needless to add that the ammonia can only be released by the admixture of an alkali or the action of the sun's rays.

As the apparatus can also be used for consuming decaying animal or vegetable matter and other refuse that usually find their way into our dustbins, it would also help to keep these places cleaner and sweeter, and render them less likely to become the putrifying heaps so frequently met with.

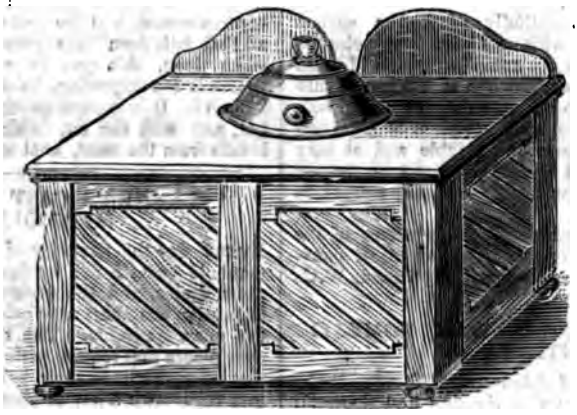

FIG. 2.

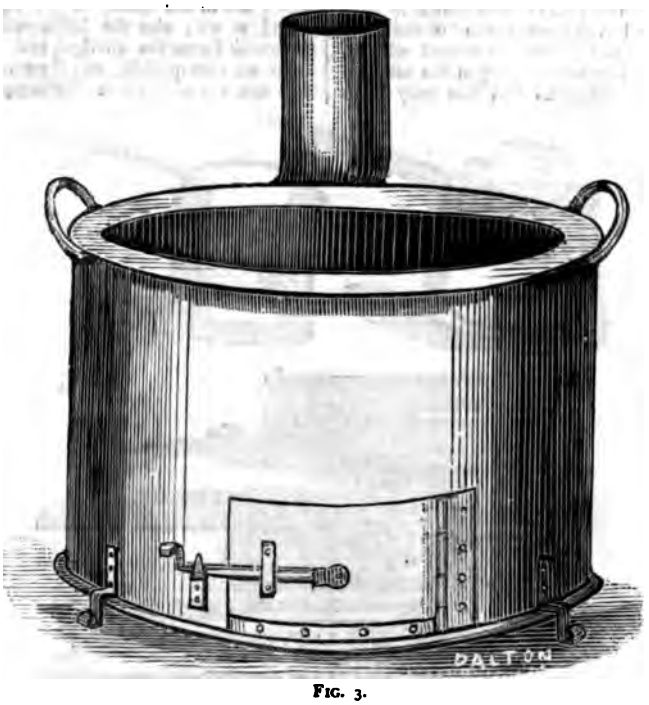

FIG. 3.

The commercial value of the anthropos manure is undoubtedly such that it should answer the purpose of the local authorities to periodically attend to the baking process on the condition that they had the manure, so that the attention on the part of the householder or superintendent of public institutions would be almost *nil*, a circumstance that should considerably influence the adoption of this apparatus, and the returns no doubt should go a great way to reduce the taxes.

It is made in another and more simple form in which

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the furnace and closet are combined in one, and in this form is lower in price than the one illustrated, the entire apparatus being fitted with small wheels that enable it to be readily moved when the burning process is required to be carried out.

The patent deals with the town sewage in large tanks, by first precipitating all matters held in solution and then evaporating all dissolved gases, which renders the effluent sewage perfectly pure. It is then oxygenated, and fit to be received into any stream or river. The solid portion is treated as before described.

The patentee has also skilfully adapted a carbon deodorising box for use with ordinary water-closets, through which, unless there is a complete system of drain and soil-pipe ventilation, sewer-gas will at times pass into the house. It is arranged to fit on existing water-closets without in any way disturbing them. This is of great importance, as any house, without any trouble and at very little expense, can be insured against sewer-gas by the use of this deodoriser, which has been chemically proved as effectual in absorbing it.

A syndicate is now forming for the working of the patent, and further particulars can be obtained, or specimen closets seen, at the office (*pro tem.*), 283 Strand, W.C.

MESSRS. GROOM & CO.'S NEW DOMESTIC INVENTIONS.

MESSRS. GROOM & Co., of Liquorpond Street, E.C., whose ingenious improvements in cooking and domestic utensils have been brought to the notice of our readers on several occasions, have introduced an improvement in milk saucepans, vessels also used in the preparation of custards, blancmanges, &c. Drawings of the new utensil will be found below, the improvement made being in the earthenware or inner saucepan. Hitherto this has only been

allowed to fall a certain distance into the outer or metallic saucepan, and having a portion of its surface exposed to the heat of the fire, if flame touches it, it will often crack and break, spoil the contents as well as destroy the utensil. Another objection to its shape has been that it was 'sharp' or square at its bottom edge, the result being that in stirring, the spoon never touched the sides, and a lumpy, coagulated portion of the contents often remained when the preparation was turned out. The new earthenware interior, as shown in the drawing, with a portion of its side withdrawn, is rounded at the base, enabling the spoon to follow its shape and keep in motion the whole of the contents, preventing the possibility of the settlement of lumpy particles; a further improvement being that it drops into the outer or water saucepan to a level with the rim, thus obviating the danger of cracking or breaking from the heat of the fire. The other new utensil is an improved bacon-toaster, suitable also for steaks, chops, &c. The toaster is simply one of those appliances known as a game oven, with an earthenware dish at the bottom. As the viands are cooked, all that falls from them goes to the earthenware pan, and when done, this pan is removed to the square dish shown in the engraving, holding hot water, and the bacon laid on it. It is in consequence brought to table thoroughly hot, and with the fat, which many persons like just as it falls from the meat, kept warm during the meal.

BANNER'S CAST IRON AIR-TIGHT MANHOLE COVERS.

EVERY day the necessity of an easily removed, reliable manhole cover is felt by those who are engaged in laying down drains, and the constant increase in the number of inspection chambers now being made renders the appliance the more desirable. The removing of flag-stones fixed over places that require periodical inspection, is a nuisance, that often results in their being neglected, while the cast-iron cover with a key (a plan commonly adopted) has this disadvantage, that oftentimes, when required, the key is either not in the hands of the right person or cannot be found at all; also the India-rubber band or washer that generally forms the air-tight seal to this cover, appears to wear out very quickly, and if not replenished in proper time becomes the medium for the escape of noxious gases. The improved 'Banner' cover is the result of experiments carried out by the firm in connection with a contract they have recently completed at the Great Northern Hotel, King's Cross, for relaying and improving the entire drainage of the building. In the arrangements a series of inspection chambers were provided that would enable the engineer to see at a glance if anything was wrong, and as objection was taken by him to any existing style of manhole cover for reasons assigned above and other causes, it

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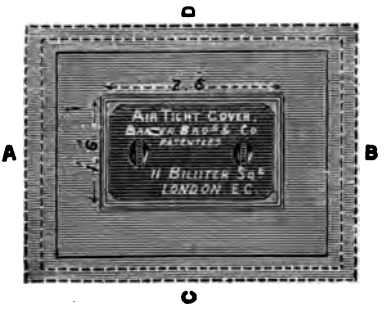
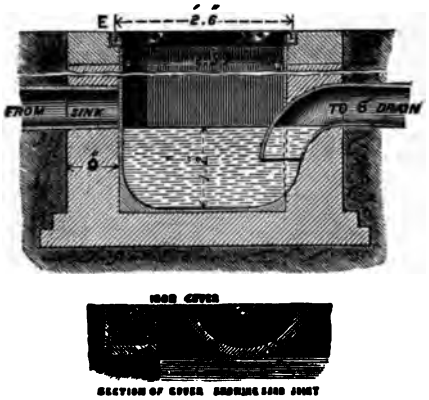
became necessary to improvise some other means, the one in question being the result, which we understand has given entire satisfaction. We append engravings of



PLAN. COVER ON



SECTION OF COVER SHOWING SAND JOINT

the ground plan with cover on, a sectional view showing sand joint, and one of a simple fat trap (with the new cover) largely and successfully adopted by Messrs. Banner. The new feature connected with this cover is the introduction of a groove or channel sunk around the edge of the iron plate on which the cover rests, the outer edge being curved inwards towards the top; this channel is filled with fine sand. The under part of the cover has a rim technically known as a knife edge, and on pressing this down into the groove, a portion of the sand is displaced, but owing to the curve at the top it cannot well escape and consequently becomes compressed, the lid resting completely on it, and so an air-tight joint is secured. The only precaution necessary we see in using these covers, is to be careful that the groove is always kept well filled. A great saving of time must be effected wherever they are used, and the fact of being able to raise them at any moment, and to replace them without assistance or fear of insecure sealing must prove a great recommendation. The inventors of these manhole covers are Messrs. Banner Brothers, of Billiter Square, E.C.

DOMESTIC ANTISEPTICS.

LAST month we alluded to various disinfectants and deodorisers mostly for domestic use. This month we shall point out a few articles which belong almost exclusively to the 'housekeeper's' province, and if the mother of the family is housekeeper also, so much the better for what we have to say.

November days are proverbially bad for keeping food; even game may go too high; but chemistry comes to our aid here as well as in sanitation. Boracic acid and phosphoric acid are pre-eminently suited for this kind of antiseptic work. Both of them are powerful agents in retarding decomposition, and they are both free from poisonous—we might almost say from injurious—characteristics. It is quite certain that no injury could occur from their use unless they were put into the hands of some foolish specimen of the human race who is capable of any blunder in reference to drugs.

The Patent Borax Company sell in packets 'concentrated Californian borax.' It is said to soften water, but with this we have no concern for the moment. It certainly does, when used as directed, preserve game, fish, butter, &c., well. It gives no taste or smell, but it stops decomposition from setting in and arrests it when it has started. A good deal of discussion has taken place in chemical circles as to the way in which it acts; the general opinion seems to be that it liberates phosphoric acid from the organised tissues, and that the latter is the deodorising agent. Whether this opinion is correct or not matters little to the user, for it certainly does its work well.

Glacialine prepared by the Antitropic Company is as good. This compound is sold without any disclosure of its composition. It contains phosphoric acid and nothing injurious to food. We have tried it in some cases with considerable success on milk, cream, and butter. They are all difficult to preserve, so success here may and most likely does mean that it is suitable for other food products.

The Patent Borax Company manufacture a number of other preparations, some of which we have tested. 'Boraxaline' is perhaps the best. The label says it may be used for softening water. We wish this statement was left out, for its effect in this respect is small, and the good, when the water is softened, very doubtful; but when the same label speaks of the value of boraxaline as a hair-wash and a tooth-powder, we quite endorse the statement. In both these cases preparations of borax are in their right place.

The same remark applies with even more force to sponge-powder, for cleaning sponges and hair-brushes. Borax here is likely to be of great service.

As to borax soaps and starches, they are very good—for dirty people—of whom, unfortunately, there are plenty in the world. Where strict cleanliness and the daily bath is the rule, borax soap is scarcely needed, but the field of detergents is large, and these soaps certainly have antiseptic properties.

REVIEWS.

Principles of Health in Childhood, Manhood, and Old Age. By LOUIS KING, M.R.C.S. London: Hamilton & Adams. Bath: W. Lewis & Son. 1883. 8vo. Pp. 185.

A POPULAR book, containing much useful information and advice in simple language, not only on the subjects named on the title-page, but on others, as drainage and ventilation, nursing, and treatment of emergencies and poisons, indicated on the cover, as well as a very sketchy outline of physiology as an introduction.

Perhaps the best chapter is that entitled Instructions to Nurses, and that on the management of infancy and childhood is full of good sense, though the author's ideas on the pathology of rickets are of the old school. As, however, the work has been noticed more or less fully by most of our medical contemporaries, we shall confine our attention to those chapters which treat of sanitary matters. And here we may remark, what we cannot but regard as a serious defect, the almost entire absence of reference to the researches and observations of the acknowledged leaders of science, which is no less conspicuous in the chapters on digestion and foods. A man who undertakes to teach the public should either be an authority himself or should freely quote from the writings of those who are; and though he may have met in his own practice many examples of disease arising from insanitary surroundings and so forth,

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he would greatly strengthen his arguments by reference to the carefully investigated and published cases which have become the common property of the civilised world. The contrary course indicates, we will not say egotism, but a degree of self-assertion which, though it may impress patients, is out of place when addressing others. But, coming to details, we may remark that however desirable it may be to have the drains outside the house, the too frequent case of drains passing of necessity under it should be dealt with, and the way in which the best may be made of a bad arrangement pointed out. Again, the omission of any mention of the abominable character of the pan closet, with container and D trap, and of the common servants' hopper-closet, which may so easily be replaced by flush-out or valve closets, of which there are many good and inexpensive patterns, is a grave mistake. A few figures of these and of good traps might have been borrowed from any illustrated trade catalogue. The unsiphoning of traps when several wastes communicate with a common stack is not alluded to.

The writer seems, too, to be strangely ignorant of the recent literature of arsenical poisoning when he speaks of *green* papers only as dangerous, whereas no one at all familiar with the question could fail to insist on the fact that colour is no guide; any colour may contain arsenic, and every shade of green may be had quite free from it. The *tinted* lime-washes or distempers which he recommends instead may be just as arsenical as the papers, and are very easily detached. His remarks on filters are meagre in the extreme; the relative merits of charcoal and spongy iron and the dangers of foul filters should have been explained, when the general public know nothing of these matters.

The section on brain stimulants is fair enough in itself; but here, again, there is no reference to the labours of Anstie, Binz, Parkes, and others; while several pages are filled with the history of the tobacco plant, which, however interesting, is at best but padding. He is sadly in error, however, in calling it a hardy *perennial*; any gardener might have told him that it is a half-hardy and an annual even in its native country.

Several grievous misprints are left to disfigure the pages, as Dr. Park for Parkes, carrion oil, and embrasions for abrasions.

Il Propugnatore della Salute. Naples, 1883.

THIS is the title of a popular magazine conducted by Dr. Spatuzzi of Naples, and having for its aim the general diffusion of sound information on matters of public and personal hygiene.

Throughout Italy, from the Ministry of the Interior to the provincial commune, the authorities are, the editor tells us, supposed to be assisted by Boards of Health, but, however able may be the individual members, their tenure of office, whether depending on the popular vote or the will of the central authorities, is short and precarious, so that they are incapable of acquiring the necessary local knowledge or of continuous and methodical action; in fact, the whole sanitary machinery, though imposing on paper, is in practice useless.

With a view to enlighten the public as to the principles on which the science of public health is erected, Dr. Spatuzzi begins a series of papers or 'notes demographic and sanitary respecting the Commune of Naples,' illustrating the close relation that subsists between 'natural and social physics.' The guardians of the health of a district must be well acquainted with its *orography* or its configuration and geological character, its meteorology, and then with its demography, or, as we should say, its vital statistics, the distribution of the population and their social, industrial, and sanitary surroundings; then only will they be in a position correctly to refer any divergence from the normal death-rate, &c., to its proper cause, whether in nature or in the sphere of human actions.

In an article on hygienic hydropathy, Dr. V. Muro, after showing that the moral and intellectual greatness of old Rome was the direct result of the physical education of her sons, in which the art of bathing was a leading feature, proceeds to explain the influence of cold-bathing on the respiration, circulation, digestion, muscular system, &c., illustrating its beneficial as well as its injurious effects in individuals, and under certain circumstances by the teaching of experimental physiology. Thus far there is much good sense, simply expressed, and no quackery in Dr. Muro's letters. We hope that, in those to follow, *hydropathy* may not absorb *hygiene*.

Dr. Sormani, the eminent professor at Pavia, reports a scandalous but most ingenious manufacture of fictitious coffee beans, from a paste of bean and acorn meal, chicory, &c., so perfectly resembling the true coffee in form and colour that, except in the absence of a membrane from the hilum, they were absolutely indistinguishable by the eye. Microscopically, of course, there could be no difficulty, but this was not necessary, for on steeping in warm water, the false beans, which formed from a fourth to a half of the samples, became soft and pulpy. They bore, however, roasting and grinding admirably.

The dangers of burning charcoal in houses are insisted on by Dr. Bonito, as well as the best methods of resuscitation of persons stupefied by carbolic fumes.

The notice of foreign current literature is given to Dr. Lewell's reports on the communicability of tubercle through the milk or flesh of affected animals, illustrated by the case of a butcher of robust constitution and powerful build who, sinking under rapid tuberculosis, declared that he believed himself to be following the beasts he had slaughtered, and who were also emaciating fast. Dr. Lewell had the survivors killed, and all were condemned as highly tuberculous.

A notice of the Hygienic Exhibition at Berlin, a report of a local society, and an announcement from the editor that the next numbers will contain copious extracts from Prof. Sormani's proposals for reducing the mortality of the Italian army, and Prof. Pagliani on the etiology of the typhoid epidemic in Paris, as well as the draft of a bill based on the researches of Tommasi-Crudeli as to the cause of malaria, and abstracts of all Acts affecting the public health passed during the last session, conclude the number before us.

Report of the North Carolina Board of Health, 1882.

SANITATION is very unequally advanced in different states of America, and this is one of the most unsatisfactory reports we have yet seen. Without accurate statistical data no conclusions of any real value can be drawn as to the health of a community; and the character of the materials with which American sanitarians have to work may be imagined when we find that in the return from one county, said to be 'the most reliable in the whole state' of Carolina, no fewer than 13 of the 37 deaths of white, and 21 of the 39 coloured persons, are from causes unknown, while 'hives' figures as a cause in both lists. We have it on high authority, too, that in the largest cities the births, and even the deaths (!), registered fall far short of the actual numbers. In New York 3,000 deaths annually are believed to occur in excess of the published number.

In the section of the report dealing with vaccination, we are surprised to learn that the antiquated custom of employing 'scabs,' crusts of dried lymph, pus, and epithelium, still prevails, although the reporters condemn it; and it is stated that during and after the civil war, 'vaccination' was performed indiscriminately by utterly ignorant men and women, operators and patients estimating the success of the inoculation by the virulence of the 'filthy sores' that followed the purulent infection.

Excellent advice and information is given on the subject of vaccination, human and bovine, as well as to shipmasters on the treatment of river-fevers; and a report on

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the removal and destruction or utilisation of 'garbage' and sewage by the veteran sanitarian, Dr. W. Wight, is inserted *in extenso*. The unsatisfactory character of the water-supply of American towns generally is treated on, and the question of the influence of patent medicines on the public health discussed. The sale of secret nostrums has attained enormous proportions in America, one of the worst forms being that of preparations of *morphia* advertised as *cures* for the habit of *opium* eating (!)

LAW REPORTS.

Taking the Cream off.

At the Coventry City Police Court, Mr. John Warden, farmer and milk dealer, of Earlsdon, near Coventry, was summoned by Mr. Frederic Booken, the sanitary inspector, for selling to the prosecutor a sample of milk from which twenty-five per cent. of the cream had been abstracted. The inspector on being called stated the particulars as to the purchase from the defendant, and also put in as evidence the certificate of Dr. Alfred Bostock Hill, of Birmingham, public analyst for the city of Coventry, with the result as stated above. The defendant pleaded guilty, and his solicitor urged in extenuation that on the day when the purchase was made a portion of the cream had been taken from the milk in the absence of the defendant, and without his knowledge or consent. The bench characterised the offence as a very serious one, and fined him five pounds and costs, and hoped that it would be a caution to him in the future.

SANITARY JOTTINGS.

SANITARY.

A Sanitary Sermon.—The *Water* and *Gas Journal* reports a portion of a sermon lately, in which the preacher, in speaking from the text, 'Thou shalt not tempt the Lord thy God,' illustrated the sermon by saying, 'We continually pray to God for health, and yet tempt Him with filthy streets, sewer-gas, and bad water.'

At the last meeting of the Hexham Rural Sanitary Authority, Dr. Maclagan, medical officer of health, stated that the death-rate of the last quarter gave an approximate annual death-rate of 13 in the 1,000. The chairman drew attention to this in contrast to Newcastle as affording an example of the relative healthiness of town and country life.

An indignation meeting of the inhabitants of Byker was held on Nov. 6 to protest against the building of the proposed hospital for infectious diseases in that neighbourhood by the Corporation of Newcastle. Mr. Councillor Sutton said that the main reason why the Byker site was selected was because the land belonged to the Corporation.

Sanitary matters in Nottingham appear to be in a very healthy state, and the municipality are quite awake to the value of judicious sanitation. Much attention is paid to the improvement of the low parts of the town. The refuse is disposed of in a very satisfactory manner; a small-pox hospital is projected, and the sewage is dealt with in an excellent way. The encouraging result is that Nottingham has the seventh lowest death-rate amongst the twenty large towns of England, and it is fairly to be presumed that, when the contemplated improvements are carried out, it will take a higher position as to its ratio of deaths to population.

SEWERAGE.

Lower Thames Valley Drainage.—The Lower Thames Valley Main Sewerage Board have chosen the Mortlake site for the proposed sewage works, and the chairman (Sir Thomas Nelson) and two other members have been authorised to negotiate for the purchase. The two other sites proposed by the engineers, Messrs. Mansergh and Melliss, were at Barnes and Ham Fields.

WATER SUPPLY.

New Liverpool Water Scheme.—From a return of expenditure on the new Liverpool water scheme for the last three months, it appears that 9,770*l.* was spent on permanent works, including trench and masonry dam, 2,673*l.* on permanent roads and bridges and their repairs, 1,154*l.* for miscellaneous plant, the total for the quarter for apportionment of wages paid and material used at the Llanwddyn work being 17,228*l.*, making a grand total of 147,936*l.* The sum of 9,115*l.* was expended during the last three months at Llanwddyn Quarry, raising the grand total here to 41,702*l.*, and on the aqueduct there was spent for the quarter ending Sept. 30 the sum of 41,768*l.*, making the aggregate cost from the commencement 349,201*l.* The whole of the money spent on land and easements from the beginning of the work until the 30th ult. was 191,941*l.*

The work of constructing new waterworks for Cheltenham has been commenced in the Dowdeswell Valley. week. The present supply of water is about 250,000 per diem, and the new scheme, which has been prepared by Mr. Bateman, C.E., will give a supplementary supply of 700,000 or 750,000 gallons daily, at a cost, it is estimated, of about 7*l.* 10*s.* per 100,000 gallons. The cost of the new waterworks, with the purchase of the land, is estimated to be about 84,000*l.*, which, with the sum originally paid by the Corporation for the old waterworks, will raise the amount the town has paid for its water supply to something in excess of 300,000*l.*

PARKS AND OPEN SPACES.

A New Park at Huddersfield.—The Beaumont Park was recently opened at Huddersfield by the Duke and Duchess of Albany. This park, which was presented to the town by Mr. Beaumont, is twenty-one acres in extent, and under the care of Mr. R. S. Dugdale, C.E., the borough engineer, has been admirably laid out with a large lake, a smaller lake, grottoes, and ornamental walks. The works so far have cost the sum of 20,000*l.*, but as the park is only about half completed a considerable sum will yet have to be spent upon it. At the opening ceremony the Duke of Albany took occasion to congratulate Mr. Dugdale on the taste and skill with which he has adapted the natural beauties of the situation to the purposes to which the ground is henceforth to be devoted.

PUBLIC BATHS AND WASHHOUSES.

The Lewisham Vestry have voted the sum of 17,000*l.* for the erection of public baths and washhouses in the parish. There are to be two baths, one at Ladywell and the other at Forest Hill, and they will be erected from the designs of Messrs. Wilson, Son, and Aldwinckle, of Leadenhall Avenue, E.C., who were successful in a competition by architects which was promoted by the commissioners.

The foundation-stone of new public baths has been laid at Carlisle. The cost of these baths is being defrayed out of the profits derived from the gasworks, and the plans have been prepared by Mr. J. Hepworth, A.M.I.C.E., engineer and manager to the Gas and Water Committee of the city of Carlisle. The entire area to be occupied by the baths is 1,378 square yards. The outer dimensions of the building are 126 ft. by 100 ft., the latter measurement being the frontage to James Street, and the former the frontage to Wood Street. The walls are of red brick, relieved with red-stone dress-

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ings and terra-cotta panels. The principal entrance to the building is from James Street. The first-class swimming-bath is 60 ft. long, 30 ft. wide, and 3 ft. 6 in. deep at one end, falling to 7 ft. at the other; there are seventeen dressing-boxes; foot and shower baths; four first-class private or slipper baths; and a Roman bath, with shower, spray, and vapour baths. A second group includes six second-class private or slipper baths; shower and vapour baths; swimming-bath, 65 ft. by 30 ft., 3 ft. 6 in. deep at shallow end, falling to 7 ft. at the other extreme, with twenty-nine dressing-boxes; above which is a balcony with balustrade (approached by stairs), for use when swimming competitions are being held. In a third group accommodation is provided for ladies. This includes a swimming-bath, 29 ft. by 16 ft., 3 ft. deep at the shallow end, falling to 5 ft. at the other, with six dressing-boxes and a waiting-room. There are also four private baths and a Roman bath, fitted with shower and spray baths. The swimming-baths are to be lined with white glazed tiles, and the private baths are to be of porcelain.

COMPETITIONS.

STATISTICAL SOCIETY.

Newmarch Memorial Essay.

The sum of £100 has been placed at the disposal of the Council of the Statistical Society by Mr. H. D. Pochin for an essay in memory of the late Mr. Wm. Newmarch, F.R.S., 'On the Extent to which Recent Legislation is in accordance with, or Deviates from, the True Principles of Economic Science; and showing the Permanent Effects which may be expected to arise from such Legislation.' The Council accordingly invite public competition for the prize above mentioned. Essays must be sent in on or before May 1, 1884.

The conditions of competition may be obtained from the Assistant Secretary, at the office of the Society, Somerset House Terrace, W.C.

EXAMINATION OF LOCAL SURVEYORS AND INSPECTORS OF NUISANCES.

At an examination held on Nov. 1 and 2 at the Sanitary Institute of Great Britain, ten candidates presented themselves. The Institute's Certificate of Competency to discharge the duties of Local Surveyor, was awarded to W. R. Maguire, and the Institute's Certificate of Competency to discharge the duties of Inspectors of Nuisances was awarded to W. H. Wells, Jesse Kemsley, T. A. Croghan, James Maguire, and W. J. Joyner.

PURIFICATION OF SEWAGE AT THE GREAT INTERNATIONAL FISHERIES EXHIBITION.

The Special Commissioners appointed by Her Majesty's Government have awarded a gold medal to the Native Guano Company, of Aylesbury, for their exhibit of 'Processes for rendering streams polluted by sewage and chemical or other works, innocuous to fish life.'

NOTICES OF MEETINGS.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

The next meeting of this Association will be held on Dec. 1, at 8 P.M., at the Parkes Museum, Margaret Street, Cavendish Square. The Paper to be read is on 'Tenure of office,' by Mr. E. S. May, Sanitary Inspector of Ramsgate.

SOCIETY OF ARTS.

The 130th session of the Society of Arts will commence on Nov. 21, with an opening address from Sir William Siemens, the chairman of the Society's Council. Previous to Christmas there will be four ordinary meetings, in addition to the opening meeting, and for these the following arrangements have been made:—Nov. 28, A. J. R. Trendell, 'The International Fisheries Exhibition of 1883;' Dec. 5, Thomas T. P. Bruce Warren, 'The Manufacture of Mineral Waters:' Dec. 12, Thomas Fletcher, F.C.S., 'Coal Gas as a Labour-saving Agent in Mechanical Trades;' Dec. 19, W. H. Preece, F.R.S., 'The Progress of Electric Lighting.' There will be six courses of lectures delivered during the session, under the bequest of Dr. Cantor. These will be—1st, 'The Scientific Basis of Cookery,' by W. Mattieu Williams, F.C.S.; 2nd, 'Recent Improvements in Photo-Mechanical Printing Methods,' by Thomas Bolas, F.C.S.; 3rd, 'London Houses,' by Robert W. Edis, F.S.A.; 4th, 'The Alloys used for Coinage,' by Professor W. Chandler Roberts, F.R.S., Chemist of the Royal Mint; 5th, 'Some New Optical Instruments and Arrangements,' by J. Norman Lockyer, F.R.S., F.R.A.S.; and 6th, 'Fermentation and Distillation,' by Professor W. Noel Hartley, F.C.S. The usual short course of Juvenile Lectures will be delivered during the Christmas holidays. The subject will be 'Crystals and Crystallisation,' and the lecturer Mr. J. M. Thomson, of King's College, London.

THE PARKES MUSEUM OF HYGIENE,

74A Margaret Street, Regent Street, W.

Lectures (3 P.M.)—Winter Session, 1883–1884.

On Thursday, Nov. 15, Dr. Robert J. Lee will lecture 'On the Disinfection of the Atmosphere.' The lecture will be illustrated by experiments and demonstrations. Thursday, Nov. 22.—Mr. George Murray, of the national history department of the British Museum, 'On the Potato Disease.' The lecture will be illustrated by microscopical preparations and diagrams. Thursday, Nov. 29.—Dr. Charles Kelly, professor of hygiene in King's College, London, 'Diseases caused by Sanitary defects in Houses.' Thursday, Dec. 6.—Dr. G. V. Poore, professor of forensic medicine in University College, London, 'On Coffee and Tea.' Thursday, Jan. 17.—Mr. T. Pridgin Teal (of Leeds). 'Economy of Coal in Private Houses.'

The lectures will be followed by discussions. Non-members:—Admission to each lecture, 6d.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

1 Adam Street, Adelphi, London.

Session 1883-84.

T. O. Dudfield, M.D., President.

The next meeting will be held on Friday, Nov. 16, at 7.30 P.M. The minutes of the last meeting will be read. The Council will present a report on:—1. The Factory and Workshops Act. 2. The Public Health (Dairies, &c.) Bill. 3. The Diseases Prevention (Metropolis) Act. Dr. Conway Evans, Medical Officer of Health of the Strand District, proposed by Mr. Lovett and Dr. Vinen; and Mr. R. Bianchi, Medical Officer of Health of St. Saviour's District, proposed by Mr. S. Murphy, and Dr. Vinen, will be balloted for as Metropolitan members. Mr. H. P. Potter, S.Sc.Cert.Camb., Resident Medical Superintendent, Kensington Poor Law Infirmary, proposed by Dr. Dudfield and Dr. Vinen, will be balloted for as an Associate. A paper will be read by Edward Nicholson, Esq., Brigade Surgeon, Army Medical Department (Retired List), on 'The Water Supply of Troops in India.' J. Northcote Vinen, M.D., St. John's, Southwark, S.E.; Shirley F. Murphy, 158 Camden Road, N.W., Hon. Secs. The meeting to be held December 21 will be devoted to short communications and conversation. Members desirous of introducing subjects are requested to communicate with the Secretaries.

INTERNATIONAL FISHERIES EXHIBITION.

Gold medals have been awarded for medicinal cod liver oil to T. J. Smith, Newfoundland—(two), J. Grung. For cured and tinned fish to A. O. Crawford, Robert Stephen, R. Mowat, J. Cormack, Sayer & Co., Sweeting & Co., John Moir & Son, J. Edmunds. Cornish Sardine Company, H. S. Ward & Co., T. Kerrison Bellis. Sweden—F. Carlson, O. Christiansson, J. J. Hallgren, C. A. Krussell, A. Lysell. America—C. Alden, J. W. Beardsley's Sons, Fish Commission, Potter & Wrightington, L. Pickert & Co., B. S. Snow & Co. Canada—Government Exhibit. Newfoundland—Harvey & Co., Johnston, Bain, & Co., W. Grieve & Co. Norway—D. Brynildsen, Mowinckel & Son, Nordlands Preserving Company, Stavanger Preserving Company (two), Tromso Exhibit, N. R. Parelius, Fosna Rogeri, Parelius and Lossius, T. Ronneberg. Russia—T. Semenoff, A. Alibekoff, N. Sokoloff. France—Pageant-Rondenet & Beuchet, Pellier Frères. Spain—G. J. Goday, P. C. Fernando. Newfoundland (for tinned lobsters).

CORRECTIONS.

In M. Vignal's report on the 'First Swiss Alpine Milk,' published in The Sanitary Record of September 15, in one of the analyses of this milk made by Professor Fresenius, and quoted by M. Vignal as the most conclusive proof among many, that no foreign substance is introduced into the milk condensed by the First Swiss Alpine Milk Company, the term *Borax* is substituted for *Kali*.

The authentic analysis is as follows:—

	In 2·36 parts.		100 parts.
Kali	0·630	...	26·69
Natron	0·256	...	10·85
Lime	0·543	...	23·01
Magnesia	0·057	...	2·41
Oxide of iron	Traces	...	Traces
Phosphoric acid	0·669	...	28·35
Sulphuric acid	0·049	...	2·08
Chlorine	0·202	...	8·56
	2·406	...	101·95
Less oxygen of chlorine	0·046	...	1·95
	2·360	...	100·00

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'THE VENTILATION OF SEWERS.'

Mr. W. P. Buchan, of Glasgow, points out that on p. 199, first column, thirty-sixth line from top, the words 'ventilation of drains' should read 'ventilation of sewers.

APPOINTMENTS UNDER THE PUBLIC HEALTH ACT.

Medical Officers of Health.

Barr, John, M.B., C.M., Univ.Glasg., has been re-appointed Medical Officer of Health for the Rishton Urban Sanitary District, at £20 for one year.

Bennett, Frederick Charles, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Okehampton Rural Sanitary District, at £50 per annum, for three years, *vice* Ash, whose appointment has expired.

Bromley, John Bourne, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the second division of the Halstead Rural Sanitary District, at £60 for one year.

Burd, George Vanhouse, L.R.C.P.Edin., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Okehampton Urban Sanitary District for one year.

Coleman, Matthew Owen, M.D.Univ.Aberd., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Surbiton Urban Sanitary District, at £50 for one year.

Coveney, James Henry, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Prestwich Urban Sanitary District, Lancashire, at £40 for one year.

Davidson, Patrick Moir, L.R.C.P.Edin., L.F.P.S.Glasg., has been re-appointed Medical Officer of Health for the Congleton Urban Sanitary District, at £20 per annum, until June 24 next.

Hill, Robert Bryden, M.D.Univ.Edin., L.R.C.S.Edin., S.S.Cert. Cantab., has been appointed Medical Officer of Health for the Oldham Urban Sanitary District, and Medical Director and Attendant of the Westhulme Infectious Infirmary, at £400 per annum, *vice* Sutton, resigned.

Hinds, James, M.B.Univ.Lond., L.R.C.P.Edin., L.R.C.S.Edin., has been re-appointed Medical Officer of Health for the first division of the Halstead Rural Sanitary District, at £44 8*s.* for one year.

Jacob, Edward Long, M.R.C.S Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the newly-formed Carshalton Urban Sanitary District, at £40 per annum.

Jones, William Rees, M.B., C.M.Univ.Glasg., has been appointed Medical Officer of Health for the Brecknock Urban Sanitary District, at £50 per annum, *vice* North, resigned.

Manthorp, Maurice Levett, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Walton-on-the-Naze Urban Sanitary District, at £20 for one year.

McCulloch, Charles, L.F.P.S.Glasg., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Holme Cultram Urban Sanitary District, Cumberland, at £20 for one year.

Paget, Charles Edward, L.R.C.P.Lond., M.R.C.S.Eng., has been appointed Medical Officer of Health for the Bowness, Grasmere, Kendal, and Windermere Urban, and the East Ward, Kendal, Sedburgh, and West Ward Rural, Sanitary Districts, combined, at £400 per annum for three years, from Sept. 29 last, *vice* Page, appointed Medical Officer under the Local Government Board.

Pullin, Thomas Henry Stocker, M.D.Univ.St.And., F.R.C.S. Edin., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Sidmouth Urban Sanitary District, at £35 per annum, for three years.

Standen, Peter, M.B., C.M., Univ.Edin., has been re-appointed Medical Officer of Health for the Mansfield Rural Sanitary District, at £80 per annum for three years.

Winter, Walter Henry Trimnell, L.K.Q.C.P.Ireland, M.R.C.S. Eng., has been appointed Medical Officer of Health for the Tettenhall Urban Sanitary District, at £20 per annum.

Surveyors, Clerks to Guardians, Inspectors of Nuisances, &c.

Alexander, Mr. Samuel, Banker, has been appointed Treasurer to the Woodbridge Guardians and Rural Sanitary Authority, *vice* Mr. Frederick Alexander, deceased.

Algar, Mr. R. J., has been elected vice-Chairman of the Chelmsford Guardians and Rural Sanitary Authority, *vice* Corder, elected chairman.

Allsop, Mr. George, has been re-appointed Inspector of Nuisances for the Mansfield Rural Sanitary District, at £100 for one year.

Askwith, Mr. Thomas, of the Bradford Old Bank, Ripon, has been appointed Treasurer to the Ripon Guardians and Rural Sanitary Authority, *vice* Wood, resigned.

Atkinson, Mr. Robert, has been appointed Collector of Water rates to the Tynemouth Rural Sanitary Authority, at 4 per cent. commission.

Bartlett, Mr. Thomas, has been appointed Treasurer to the newly-formed Carshalton Local Board and Urban Sanitary Authority.

Blakeway, Mr. George Sheffield, Solicitor, has been appointed Town Clerk and Clerk to the Urban Sanitary Authority of Gloucester, at £500 per annum, with professional charges for parliamentary and special business, furnished office, &c.. *vice* Fryer, resigned.

Broadbent, Mr. James, has been appointed Treasurer to the Congleton Guardians and Rural Sanitary Authority, *vice* Wingate, deceased.

Buchanan, Mr. T., has been appointed Treasurer to the Winchcomb Guardians and Rural Sanitary Authority, vice Goddard, deceased.

Calley, Mr. W., has been appointed Collector to the Lower Brixham Local Board and Urban Sanitary Authority, at £37 per annum, *vice* Clarke, resigned.

Chapman, Mr., has been appointed Clerk to the newly formed Seaford and East Blatchington Local Board and Urban Sanitary Authority, Sussex, at £45 per annum.

Corder, Mr. E., vice-chairman, has been elected Chairman of the Chelmsford Guardians and Rural Sanitary Authority, *vice* Christy, deceased.

Gould, Mr. John, has been appointed Surveyor to the Newbold and Dunston Local Board and Urban Sanitary Authority, Derbyshire, vice Clark, appointed Surveyor and Inspector of Nuisances to the Market Harborough Local Board and Urban Sanitary Authority.

Grimshaw, Mr. Richard, has been appointed Inspector of Nuisances for the Rishton Urban Sanitary District, at £50 for one year.

Hanson, Mr. Edward, has been appointed Treasurer to the Westbourne Guardians and Rural Sanitary Authority, Sussex, *vice* Morris, resigned.

Harris, Mr. Alfred E., has been re-appointed Public Analyst for the Borough of Sunderland for five years.

Hawes, Mr. Thomas, has been appointed Collector to the Madron Local Board and Urban Sanitary Authority, at £14 10*s.* per annum, *vice* Pengelly, resigned.

Heward, Mr. Thomas Lockwood, has been appointed Surveyor and Inspector of Nuisances to the newly-formed Carshalton Local Board and Urban Sanitary Authority, at £30 and £40 per annum.

Hill, Mr. Henry, has been elected a Member of the Openshaw Local Board and Urban Sanitary Authority, *vice* Mellor, appointed Clerk.

Houchen, Mr. John, jun., Solicitor, has been appointed Town Clerk to the Urban Sanitary Authority of Thetford, at £25 per annum as Town Clerk, and £30 per annum as Clerk to the Urban Sanitary Authority, *vice* Mr. John Houchen, resigned and since deceased.

Howes, Mr. Henry, has been re-appointed Inspector of Nuisances for the Aylesbury Urban Sanitary District, at £15 for six months, from Oct. 12.

Hucker, Mr. John, has been appointed Clerk to the Horfield Local Board and Urban Sanitary Authority, Gloucestershire, at £40 per annum, *vice* Pingstone.

Hulland, Mr. Jonathan, has been appointed Surveyor and Inspector of Nuisances to the newly-formed Tettenhall Local Board and Urban Sanitary Authority, Lancashire, at £78 per annum.

Kellam, Mr. John Henry, has been appointed Inspector of Nuisances and Surveyor for the Stamford Rural Sanitary District, at £100 per annum, from year to year, *vice* Sellors, resigned.

Lowe, Mr. W. Foulkes, has been appointed second Public Analyst for the County of Denbigh at £2 2*s.* per annum, and 10*s.* 6*d.* per analysis.

Lumb, Mr. David, has been elected a Member of the Staniland Local Board and Urban Sanitary Authority, Yorkshire, *vice* Morton, resigned.

Mellor, Mr. Charles Henry, has been appointed Clerk to the Openshaw Local Board and Urban Sanitary Authority, Lancashire, at £100 per annum, *vice* Hodder, resigned.

Michell, Mr. Thomas, has been appointed Surveyor and Inspector of Nuisances to the Ludgvan Local Board and Urban Sanitary Authority, Cornwall, at £50 per annum, vice Bear, resigned.

Paine, Dr. Henry James, Vice-Chairman of the Cardiff Guardians and Rural Sanitary Authority, has been elected Chairman, *vice* David, deceased.

Plain, Mr. T. W. H., has been elected second Vice-chairman to the Cardiff Board of Guardians and Rural Sanitary Authority.

Puckle, Mr. Thomas Broadhurst, has been elected Chairman of the newly-formed Carshalton Local Board and Urban Sanitary Authority.

Riding, Mr. William, has been re-appointed Inspector of Nuisances for the Kirkham Urban Sanitary District, at £20 per annum.

Saul, Mr. R. W., has been elected a Member of the Lowestoft Board of Improvement Commissioners and Urban Sanitary Authority, *vice* Seago, resigned.

Simpson, Mr. George, has been elected second Vice-chairman of the Chelmsford Guardians and Rural Sanitary Authority.

Smith, Mr. William Ackers, has been appointed Clerk pro. tem. to the newly-formed Carshalton Local Board and Urban Sanitary Authority.

Stubbs, Mr. Robert, has been re-appointed Inspector of Nuisances for the Holme Cultram Urban Sanitary District, at £20 for one year.

Tucker, Mr. Mark, has been appointed Inspector of Nuisances for the Western Division of the Neath Rural Sanitary District. for six months, at the rate of £91 per annum. Mr. W. Edmond Thomas, the present Inspector, stills holds office for the Eastern division).

Tuck, Mr. W. C., Solicitor, has been appointed Town Clerk and Clerk to the Urban Sanitary Authority, Southwold, Suffolk, vice Allen, deceased.

Turner, Mr. William Webb, has been appointed Surveyor to the Seaford and East Blatchington Local Board and Urban Sanitary Authority, at £35 per annum.

Wainwright, Mr. George, has been appointed Clerk to the Penrith Local Board and Urban Sanitary Authority, at £140 per annum, *vice* Atkinson, resigned.

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WATERHOUSE, Mr. J. D., has been appointed Treasurer to the Ashton-under-Lyne Guardians and Rural Sanitary Authority, *vice* Coulthart, resigned.

WATSON, Mr. George, has been appointed Inspector of Nuisances for the Burton-on-Trent Rural Sanitary District, at £200 per annum, from year to year, *vice* Barry, whose appointment has expired.

WHARTON, Mr. Hugh, has been re-appointed Inspector of Nuisances for the Chester Urban Sanitary District, and his salary increased from £120 to £140 per annum for five years, and for the Chester Port Sanitary District up to March 25, 1884, at the rate of £10 per annum.

WHITE, Mr. Charles, has been re-appointed Collector to the Horfield Local Board and Urban Sanitary Authority, at £40 per annum.

WHITFIELD, Mr. George, Banker, has been appointed Treasurer to the newly formed Seaford and East Blatchington Local Board and Urban Sanitary Authority.

WILSON, Mr. Richard, has been re-appointed Collector and Inspector of Nuisances to the Arlecdon and Frizington Local Board and Urban Sanitary Authority, Cumberland, upon commission as Collector, and his salary increased from £30 to £40, as Inspector, both for one year.

LOCAL INTELLIGENCE.

THE LATE CLERK TO THE ST. GEORGE LOCAL BOARD AND URBAN SANITARY AUTHORITY, GLOUCESTERSHIRE.—At the last meeting, Mr. William Butler, the chairman, in mentioning the death of Mr. Edwin Parry, the clerk, said that they all had a deep respect for him; and those who differed from him in opinion upon some matters, must have greatly respected him for his general character. He had always been influenced by a strong desire to do what was right; and he (the chairman) begged to move the following resolution, which, being duly seconded by Mr. J. Cousins, was adopted nem. dis.:—'That this board, having learned that its late clerk, Mr. Edwin Parry, has died since its last meeting, desires to record its profound grief at the loss which not only this board, but the parish, has sustained by the death of such a faithful and painstaking servant, who, while endeavouring to perform what were sometimes difficult duties, always strove to do so in a way and spirit that would not give offence to those who were opposed to him; and the board hereby resolve that a letter of sympathy shall be sent to Mrs. Parry, with a copy of this resolution.'

PUBLIC BATHS AT SMETHWICK.—At the last meeting of the Local Board and Urban Sanitary Authority on Friday, the 9th inst., a letter from Mr. Tangye was read, stating that if the Authority would establish public baths, the firm of which he is a member would contribute £1,000 towards the cost. The offer was accepted, and a committee appointed to have plans prepared without delay.

Mr. James Cook, Town Clerk and Clerk to the Urban Sanitary Authority of Bridgwater, has been presented with an illuminated address and list of subscribers, and a massive tea and coffee service and salver, all of solid silver, and of the value of £130, in recognition of his services as hon. secretary to the local committee in connection with the meeting of the Bath and West of England Society and Southern Counties Association, held at Bridgwater in May last. Each article is engraved with Mr. Cook's monogram and motto, 'Fide et Industria.' The presentation was publicly made at the Town Hall by the Mayor, who stated that Mr. Cook, being determined that his services should be purely voluntary, had, in return for the presentation, given fifty guineas to the Free Library and fifty guineas for another bed for patients of the Bridgwater Infirmary at the Weston-super-Mare Sanitorium.

The Keighley Town Council and Urban Sanitary Authority have increased the salary of the inspector of nuisances to £100 per annum, and that of the accountant to £150 per annum.

The Bootle-cum-Linacre Town Council and Urban Sanitary Authority have increased the salary of Mr. Robert John Sprakeling, the Medical Officer of Health, from £60 to £80 per annum.

The Sidmouth Local Board and Urban Sanitary Authority, in re-appointing the Medical Officer of Health, reduced his salary from £35 to £20 per annum. This roused the ire of the Local Government Board, who wrote stating that, in that case they would not contribute a moiety as hitherto; the result being that Dr. Pullen has been re-appointed at the former salary of £35 per annum for three years.

The Nantwich Local Board and Urban Sanitary Authority have increased the Salary of Mr. Thomas W. Fowles, the Collector, from £40 to £50 per annum.

SANITARY INSTITUTE OF GREAT BRITAIN.

PAPERS SET FOR EXAMINATION FOR LOCAL SURVEYORS AND INSPECTORS OF NUISANCES.

EXAMINATION OF LOCAL SURVEYORS. NOV. 1, 1883.

Paper 1.—1. What are the principal Sanitary Acts in force:—(*a*) In the metropolis? (*b*) In other parts of England? What are their chief provisions? 2. State the chief differences which exist between the powers exercised by Urban and by Rural Sanitary Authorities:—(*a*) As to roads, streets, and buildings; (*b*) As to sewers; (*c*) As to gas and water supply. 3. In what way does the size and shape of a sewer affect the velocity of the sewage flowing through it? If a 12-inch sewer with an inclination of 1 in 200 gives a velocity of 3½ feet per second, what velocity would it give if laid at an inclination of 1 in 800 (the pipe running half full in each case)? Would this latter suffice to keep the sewer self-cleansing? To what extent could the velocity be practically increased by flushing? 4. A complaint being made that an offensive smell proceeds from a certain sewer, what steps should be taken (*a*) to find out the cause? (*b*) to remedy the same? Illustrate your answer by a sketch. 5. What precautions should be taken in connecting house drains with sewers in order to prevent foul air from the sewers entering the houses? What kind of connections would you require for the water-closets, sinks, &c.? 6. Describe shortly the different methods of applying sewage to land, and in each case explain the conditions under which you would adopt it.

Paper 2.—1. What is meant by a 'gathering ground'? Describe the conditions which have to be observed in selecting a gathering ground for the water supply of a town. Upon what data would you base your calculations for providing a sufficient supply in all seasons? 2. The water supply of a town being undesirably hard, what means would you recommend for softening the same? Describe generally the principles involved. 3. State the geological formations which yield hard water and those which yield soft water. State also the chief difference between river water and water derived from shallow and from deep wells. 4. What is required in the way of ventilation to keep a room containing 1,000 cubic feet of air space, and occupied by one person, in a proper sanitary condition, there being a gas light burning in the room six feet from the floor, consuming four feet of gas per hour? State the amount of deterioration of the air due to the man and to the gas light respectively. Illustrate your answer by a sketch. 5. What are the sanitary advantages and disadvantages of the modern systems of street and road making? Give a brief description of each. 6. Describe the best methods for cleansing streets.

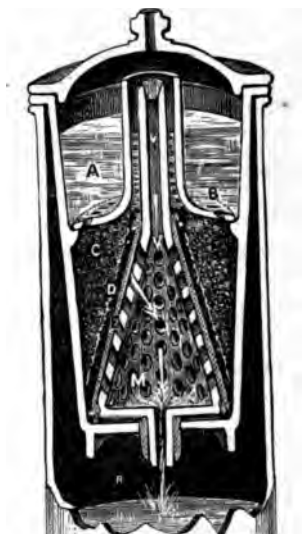
EXAMINATION OF INSPECTORS OF NUISANCES, NOV. 1, 1883.

1. Describe some of the main provisions of the Public Health Act, 1875, with reference to the duties of an inspector of nuisances. 2. On being appointed to the post of inspector of nuisances of a district, what are the duties you would at once undertake—*a*, with regard to inspection of common lodging-houses? *b*, with regard to nuisances? *c*, with respect to the wholesomeness of food? 3. Describe the method of measuring available air space in rooms. How much air space per head is desirable? How much should be insisted on? 4. What is the object of ventilation? Describe some simple methods of ventilation which you would recommend for living and for sleeping rooms. 5. What precautions ought to be taken in obtaining water supply from wells in the proximity of dwellings? 6. What precautions have to be observed to prevent the pollution of a milk supply at farms and cow-sheds. 7. If there is reason to suspect that sewer gas is escaping into houses, in what way would you proceed to examine the drains? And what points would you look to? Write a report on a supposed case such as you would send in to your medical officer. 8. You are sent for to a house where two children died the day previously of scarlet fever; what steps would you take?

MAIGNEN'S PATENT

'FILTRE RAPIDE'

is guaranteed to remove organic matter in solution and all germs of disease in water. The old filtering medium can be periodically thrown away and replaced by a new charge at a trifling cost.



For description, see SANITARY RECORD for October 15, 1883, p. 220, &c.

The Sanitary Institute of Great Britain have awarded one special medal of merit and four star certificates of merit.

National Health Society's Exhibition, Kensington, 1883, silver and only medal.

'A better filter could not be desired.'—*Lancet.*

'The "Filtre Rapide" depends upon the multiplication of the filtering surface. . . . It is worth the attention of those who require large quantities of pure water.'—*Times.*

'We found a strongly ferruginous water to be absolutely tasteless after passing through it.'—*Medical Times and Gazette.*

The simplicity of this filter enables it to be readily cleansed and repaired—or renewed, in fact.'—*Medical Press and Circular.*

Prices of Cottage 'Filtre Rapide,' 15s., 25s., 35s.

Prices of Bijou D 'Filtre Rapide,' 25s., 40s., 60s.

P. A. MAIGNEN, Patentee,

22 & 23 GREAT TOWER STREET, LONDON, E.C

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ORIGINAL PAPERS.

THE DWELLINGS OF THE INDUSTRIAL CLASSES IN THE DIOCESE OF LIVERPOOL, AND HOW TO IMPROVE THEM.*

By ARTHUR B. FORWOOD,

Chairman of the Insanitary Committee of the City Council.

NO one denies that to promote the spiritual and material welfare of the people, the prime necessity is to provide them with decent, healthy abodes. Every town and district in this diocese are concerned in the matter. Upon whom should this work devolve—the State or the individual?—are the only points of controversy. It is urged by many that a main difficulty lies with the habits of the people with whom we have to deal. Possibly so, but this does not diminish our responsibility to perform our share of the work.

Much as I deprecate over-legislation or State interference with private enterprise, yet in the matter of sanitary houses I feel that an obligation does lie upon the public authority, more particularly in a city situated like Liverpool. No person disputes the right of the State to protect life and property, and to my mind the protection of life from disease is as paramount a duty of the State as to guard us from the blows of the assassin. The artificial character of modern life, the aggregation of hundreds of thousands on small areas, render it absolutely necessary, if disease and death are to be averted, that these populations should be housed under regulations framed on sanitary principles. Liverpool is a very remarkable illustration—if any justification is needed—of the necessity of public control to ensure health and to save the toiling thousands from the evil consequences which the avarice and greed of individuals might inflict. Liverpool is a great national seaport; the trade of the country centres upon a narrow river frontage. This trade requires many thousands of labourers for its proper conduct. These must live near their work. Thus, whilst the trade is unlimited, the area for habitation is restricted. Therefore, if to any people the public have a duty to perform, it is to the inhabitants of a city like Liverpool, whose lives must be passed within the narrow compass of the port. I will now dwell for a moment upon the extent of the question at issue.

The assessments in the city are—

At	£4 and under	...	3,619
,,	£5 ,,	...	5,183
,,	£6 ,,	...	6,484
,,	£7 ,,	...	6,709
,,	£8 ,,	...	6,837
,,	£9 ,,	...	9,840
,,	£10 ,,	...	6,802
,,	£11 ,,	...	7,009
,,	£12 ,,	...	6,336
,,	£13 ,,	...	20,218
	Total	...	79,037

These figures are pregnant with meaning; they bring us face to face with startling facts. Authorities upon the question place the rent that a working man can afford to pay at one-fifth to one-fourth of his wages. I adopt the lower figure as my standard. It would therefore appear that 450,000, or six out of every seven of the inhabitants of this city, are supported out of wages of less than thirty-five shillings per week earned by the head of the house.

The assessments that I have quoted demonstrate the further fact that the rental of some 15,000 houses being less than three shillings per week, about 75,000 souls have to depend upon the weekly earnings of fifteen shillings by the bread-winner, a sum that means a constant grinding poverty.

Much of the information contained in this paper is derived from the official records of the Corporation: great local sanitarians, such as Dr. Duncan, Dr. Trench, and Mr. Newlands, have left most useful information on the files of the Municipality; and equally intelligent public officers of the present day—Dr. Taylor, medical officer of health, Mr. Dunscombe, city engineer, and Mr. Goldstraw, assistant building surveyor.

As the experience of the past will, I think, be most valuable in guiding our action in the future, I propose to give a brief historical sketch of Liverpool and its sanitary work. The Corporation of Liverpool have had a continuous and most arduous task to overtake the sanitary requirements of the city, and as regards public appreciation a thankless task. The public have never realised the vastness and difficulties of the undertaking; and those who have worked have suffered from the constant and persistent attack of stay-at-home philanthropists, who, in vindication of their criticisms, have only to refer an uninformed public to the apparent smallness of the results obtained.

In 1840 Liverpool was first aroused to her serious sanitary defects by Dr. Duncan, the then medical officer of health. Liverpool then had a population of 250,000, of whom 175,000 belonged to the labouring class. No control had been exercised over the erection of houses. Every builder or landowner did as he liked, or as his avarice prompted. The drainage and sewerage were insufficient, scavenging and cleansing were almost unknown. Sanitary science was imperfectly understood, and what rendered the task of sanitary reformers still more difficult was the want of support from a healthy public opinion. Vested rights and the personal interests of property owners had therefore little difficulty in retarding the action of sanitarians. Ratepayers were only too willing to listen to the advocates of apparent economy. Time alone could cure, and is curing, this state of things. In 1840 one-half of the labouring classes lived in courts, and some 40,000 were housed in cellars.

As some may not be familiar with the construction of a Lancashire court, as in too many cases it exists to-day, I may describe it as a strip of land with a frontage of 30 feet to a narrow street, by 60 feet in depth, abutting at the far end upon the high walls of warehouses or manufactories. Fronting and opening on to the street two three-storey houses were built. Under the floor of one of the rooms of the front house is a tunnel or passage, 3 feet wide and 5 feet to 6 feet high, to give access to the land in the rear. On this strip of back land, only 30 feet wide, are placed two rows of three-storey houses facing each other, with their backs against other houses, each with a frontage of 11 feet, and the same in depth, including walls; thus leaving barely 9 feet from window to window. Some sixty to seventy souls are crowded into this court, having to depend for their breath of life upon this narrow well

* A Paper read at the Liverpool Diocesan Conference, on Nov. 6, 1883, the Lord Bishop of Liverpool in the chair.

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of stagnant air. The horror of the situation at that time, however, did not end here; for in those days no conveniences were provided. Even when these necessaries were provided, Dr. Duncan says it was no one's business to see them emptied; and they remained full to overflowing for weeks together, until some person thought it worth moving for agricultural purposes. There are also courts formed in the back yards of old houses far worse in a sanitary sense than the one I have described. Thus were housed, in compulsory squalor and filth, 175,000 of the people of Liverpool. If their condition was wretched, what must have been the state of the 40,000 occupying cellar dwellings? I will use Dr. Duncan's own words to depict their situation :—'The cellars are dwellings underground, in many cases having no windows, and no communication with the open air except by the door, the top of which is sometimes not higher than the level of the street. When the door of such a cellar is closed, therefore, light and air are both excluded. The access to the door is by a narrow flight of steps descending from the street; the roof is often so low as not to admit of a person of moderate height standing upright; and there is frequently no floor of any kind except the bare earth. Generally, however, it is flagged, and in a very few cases boarded. There is usually only one apartment (10 or 12 feet square); but, in some cases, there is a *back* cellar, used as a sleeping room, having no direct communication with the external atmosphere, and receiving its light and air exclusively from the front apartment.' More than three-fourths of these cellars were found damp and undrained, save into a cesspool under the flags of this horrible cavern.

I have said that drainage was imperfect; upon this head Dr. Duncan says: 'With regard to the streets inhabited by the working classes, I believe that the great majority are without sewers, and that where they do exist they are of a very imperfect kind. Unless where the ground has a natural inclination, therefore, the surface water and fluid refuse of every kind stagnate in the streets, and add, more especially in hot weather, their pestilential influence to that of the more solid filth already mentioned. With regard to the courts, I doubt whether there is a single court in Liverpool which communicates with the street by an underground drain; the only means afforded for carrying off the fluid dirt being a narrow, open, shallow gutter, which sometimes exists, but even this is very generally choked up with stagnant filth.'

No doubt the habits of too large a number of our population were and even are such as to retard the efforts of sanitary action. Nevertheless, our duty will not be accomplished until we have given them a fair chance to improve. This we can do most effectually by admitting daylight and unpolluted air to their homes. Deprived of the bracing influence of fresh air, men too often resort to alcohol to overcome that feeling of depression which a vitiated atmosphere engenders.

The habits of the people in 1840 are thus described by Dr. Duncan: 'The first to be mentioned, viz., their tendency to congregate together in numbers disproportioned to the space they occupy, must be considered in many cases perhaps as the inevitable result of poverty, but may be partly also ascribed to their gregarious habits, particularly in the case of the lower Irish, and to their ignorance of its baneful consequences. It is not an uncommon practice with the keepers of lodging cellars to cover the floor with straw, and allow as many human beings as can manage to pack themselves together to take up their quarters for the night at the charge of a penny each.

'The second circumstance to be noted with regard to the habits of the working classes is their want of cleanliness.

'I have already stated that they are not responsible for *all* filth amidst which they live; but when it is considered that there are not less than 50,000 of the lower Irish resident in Liverpool, it will be understood that some portion of it, at least, must be the result of their own indifference. Even when a plentiful supply of water is at hand, the inhabitants of the filthy courts inhabited by the Irish too often neglect to avail themselves of its services; and when the removal of a nuisance is in their power, they seem to think it hardly worth the trouble which it would occasion them. In many cases the cellars beneath the houses are used as places of deposit for manure collected out of the street. The custom prevalent among the Irish of keeping pigs in the cellars, and even in the garrets which they inhabit, ought to be noticed in connection with the present subject.

'On one occasion I had to grope my way (at noonday) into a house in Thomas Street; and, on a candle being lighted, I discovered my patient lying on a heap of straw in one corner, while in the opposite corner of the room a donkey was comfortably established, and immediately under the window was the dunghill which the donkey was employed to assist in gathering from the streets.'

Twenty-five years later Dr. Trench gave the following evidence :—'Your personal visit, gentlemen, will be necessary to enable you to judge properly of the social condition which plays so important a part in the causation of typhus. It will also enable you to judge how far nationality accounts for those personal habits and that indigence which I believe has more to do with typhus than mere external physical causes. I am aware that to draw inferences from the accidents of nationality is invidious and ungracious; but I may be supposed to speak without prejudice on the subject, and I think that you will see what has often painfully struck me, that there are streets so open and so free from glaring physical defects of construction, that I could not include them in my presentment to the grand jury, and yet such streets, because of their being inhabited by poor Irish, are the foci of typhus. The fact is, the poor creatures come to us in want, live in want, and die in want.'

Liverpool contains a very large number of intelligent, sober, respectable artisans, many of whom have bought their own houses. These will also be greatly benefited by the improvement in the health and habits of those amongst whom they are compelled to live.

In 1847 Dr. Duncan's report brought forth fruit, but in the meantime the agitation had caused the evil to be aggravated, as the builders of the day anticipated legislation by erecting some 1,000 or more additional courts, raising the number to upwards of 3,000, thus leaving a still heavier legacy for the future generation to meet. Under provisions of a new Sanitary Act, underground cellars were to be closed and the construction of courts was placed under regulations—regulations that to-day we look upon as most insufficient, but which then were an important step in advance. I have said that 30,000 people lived in cellars. To close these within a brief

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period would have been manifest cruelty, so the Council wisely limited its action to 100 per month, thus occupying about five years in the operation. Such was the prudent course adopted by the practical men of that day, and I hope we shall not allow the theoretical philanthropist of to-day to drive us on, so that the remedy would become worse than the disease. This same Act led to the construction of middens, a mistake which has cost thousands of pounds to remedy, and has led to much sickness in the town. At one time not less than 200,000 of these abominations had to be emptied annually. They have now nearly disappeared, about 3,000 being closed yearly.

At this point of my narrative I must call attention to the effects of the famine in Ireland upon the health and condition of Liverpool. In one year 300,000 poor famine-stricken people passed through Liverpool, of whom 70,000 remained to crowd up the already overcrowded dwellings of the city. This was a burden upon the authorities too much for them to bear; it was a mass of distressed humanity in a low state of health, unused to town sanitary necessities, poverty-stricken, without work and without house accommodation. The result was an outbreak of typhus fever, which carried off nearly 6,000 persons, amongst whom, twelve ministers and twelve doctors succumbed in their noble work. No less than 60,000 persons were in that year stricken with fever, and 40,000 suffered from diarrhœa.

Once so contagious a disease as typhus entered the town, no arrangement could have been better devised, to use the words of Dr. Buchanan, the Local Government Board Medical Inspector, confirmed by Drs. Parkes, Sanderson, and Gee, to spread fever, than the close unventilated court-houses of Liverpool, with their crowded rooms opening one direct from another. The absence of ventilation is a main cause of the unhealthiness of the court-houses of to-day. Fever is contagious. If it breaks out in such a house, and the sanitary authority is not made aware of its existence until, as is too common, after death, it is, alas, too late to take measures to stay its spread amongst the other inmates, and so fever remains ever with us, and will do so until isolation can be ensured.

Another advance in sanitation provided by this Act was to require ventilation and window space—the window tax of that day having sadly interfered with a first necessary of existence—light. Ventilation, to be effectual, must, as far as practicable, be out of reach of the tenant.

It must be remembered that in all our legislation provision has had to be made for protecting then existing property. This is no doubt right if not carried too far. There should, however, be some limitation of time to which a private right may be allowed to prevail, to the prejudice of the health and well-being of a community.

The period between 1846 and 1864 was one of active work for the Corporation of the day. A water-supply was introduced, costing 2,000,000*l.*! 200 or 300 miles of main sewers were constructed; the town was thoroughly drained; new roads were laid out; the 200 miles of old roads were put into proper order for traffic; and an engineering and sanitary staff organised—in fact, during this period of eighteen years, everything that a town required had to be provided. Whilst this organisation was preparing, fever and cholera had wrought havoc amongst our people, and although mortality tables showed a marked improvement, much, very much, remained to be done.

The courts, now drained and flagged, still harboured pestilences when they came. This, in 1864, led to the first Act dealing in any sufficient manner with these places. This measure practically stopped the further erection of courts, of which there were 3,170, containing 18,000 houses. Up to this date, although a minimum width had been fixed for streets, no regulation existed as to space in the rear of houses. Probably no action taken by the Council has had so beneficial an influence on recent artisans' dwellings as this. No matter what size the house may be, good unobstructed ventilation back and front is now secured, so that there is a chance of the poison of contagion being so diluted as to become less dangerous in our midst.

The local Act of 1864 empowered the medical officer of health to present to the grand jury of the Quarter Sessions any houses that he might deem unhealthy in themselves, or which, by reason of their situation or condition, rendered other property dangerous or insanitary. If the grand jury concurred in the medical officer's view, the council were compelled to purchase and the owner to sell. Undoubtedly this was a well conceived measure, much in advance of that age in sanitary science. Experience, however, showed that there were defects in its machinery. The worse the class of property, the greater the advantage to the owner. He not only obtained an excessive price for what he was compelled to sell, but his remaining property was enhanced in value. The legal machinery of assessing the value was both cumbrous and costly. Much benefit has, however, resulted from the operation of this Act. Very many courts have been opened up and made fairly healthy, and the health of the town improved. Judged by the light of to-day, I regret that instead of improving the courts, and so perpetuating their existence, the authorities did not at once remove them. However, experience had to be acquired, and sanitary movements must of necessity be slow. Under this Act, six presentments of property to be demolished or bought have been made, and about 600 houses purchased at a cost of 64,000*l.*, or over 100*l.* per house, excluding legal charges.

The total amount expended has been 130,000*l.*, but out of every 100*l.*, 15*l.* has gone in legal charges, and 46*l.* in dealing with adjoining property. Only 382*l.* has returned to the public coffers from the sale of lands so purchased.

No doubt the indirect benefit derived by the ratepayers from the expenditure has been considerable, and the satisfaction of diminishing disease is beyond any pecuniary estimate. The Corporation were, however, bound as custodians of the public purse to see that the fullest benefit was obtained by the public for their outlay. The figures I have quoted demonstrated a serious defect in the Act. By the time this had, by experience, fully developed itself, Sir R. Cross passed his Artisans' Dwellings Act of 1875, and the Corporation looked to its operation as an improvement upon our local powers of 1864. In less than three months after it became law, Dr. Trench scheduled the area of Nash Grove as an unhealthy district. It comprised 22,400 yards, and the cost amounted to 67,000*l.* for compensation for trades, land, and buildings. The whole transaction was accomplished within a year from the passing of the Act. Thus, it will be seen, the Council was ever foremost in sanitary movements. There were 1,310

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persons displaced from the site, and much trade property was disturbed, at a considerable cost.

The policy of the council in taking this action was well stated by Dr. Trench at the time :—'The courts are scattered in position, rather than aggregated in blocks. They seldom cover any large amount of area, and their demolition would not, as a rule, give space for carrying out an improvement scheme such as is contemplated by the ninth section of the Act unless the demolition of houses was extended to good and healthy dwellings. Such wholesale demolition would necessitate an enormous expenditure without any commensurate advantage; and it is difficult to realise where the demolition might not eventually extend, in order to frame improvement schemes for houses in scattered courts which require to be removed. It would absolutely be prejudicial to health, insomuch as it would displace large sections of the people in order to remedy a local evil; and would be a policy worthy of those American theorists, who, from always advocating heroic and root-and-branch measures, were known as "Barn-burners," after the act of a husbandman, who, to drive out rats, burnt down the farm premises. The medical officer believes that the most prudent, and certainly the most useful and economical plan, will be to provide spaces for the erection thereon of labourers' dwellings in several districts, and then gradually to pull down bad courts, restricting, however, the demolition of court houses. The areas left by such demolition would be available for many trade purposes, and could be sold at a price pretty nearly to recoup the cost of original purchase. The necessity of first providing improved dwellings for the reception of the displaced people, before proceeding to any great extent with the demolition of ill-constructed and unhealthy courts, will be very evident if we consider the present condition of a vast number of the houses which have attached to them separate cellar habitations.

'Another reason for not, without due preparation, hurrying on the demolition of houses and courts is the fact, too well known to those who visit and work among the poor, that sickness and demoralisation of districts are as frequently due to the improvidence and home habits of the people, as to any structural defects of houses or insanitary condition of their surroundings. It is in the low, sub-let districts—where families live, without regard to sex or age, in single-room habitations—that this evil of personal neglect and uncleanliness, tending to sickness, most largely prevails; and we should be careful not to increase the area of these miserable places by suddenly and unpreparedly throwing sections of the people houseless by our so-called improvements. We should never forget that vice and bad habits are infective; that the tendency of the wretched is to be gregarious and crowd together; and that it would be worse than a mistake to compel poor, decent families to leave self-contained houses, even in badly-constructed courts, to seek shelter and herd with the improvident and vicious in those dens of misery in the low, sub-let districts of the town.'

When Dr. Trench penned the report from which I have quoted, he hoped that the clause in the Act, which rendered it incumbent upon the Corporation to sell the site for artisans' dwellings when cleared, would have become effective by private individuals purchasing the land for this purpose. It has proved, however, impossible so to dispose of it.

The experience of the Metropolitan Board in carrying out the 1875 Act has been that it has cleared sites, inhabited by 20,000 people, at a loss, after allowing for the selling value of the land, of 1,200,000*l.*, or 60*l.* per head on the population displaced. Nash Grove, on the same calculations, has cost us 40,000*l.*, or 30*l.* per head. When the Health Committee had thus a test of the results of operations under the local, as well as the general, Acts, it concluded that both were unsuited to the peculiar circumstances of the city. Under the local Act the costs were excessive, whilst under the public Act the expense was not only heavy, but we were compelled to schedule areas, whilst we only required to deal with a large number of scattered blocks of property, each limited in extent.

To meet the difficulty we promoted, in 1879, an amendment of our local Act of 1864 by a provisional order, by which the system of assessing claims was to be simplified, and the real value of the property in its existing state, and the influence any improvement made at the public expense might have on the same owner's adjoining property, was to be regarded by the valuer. The largest and most important of its provisions was a clause empowering the Corporation to take property by voluntary action. So little was the question properly understood, that I experienced much difficulty in carrying the proposition in the Council, sanitary reformers even opposing it. A Commissioner of the Local Government Board came to Liverpool to inquire into the matter, but for reasons never explained that Board allowed the application to lapse.

The application having thus failed, we tried again, and in 1881 the power to purchase voluntarily was conferred upon us by an Act which came into force in 1882. To-day, therefore, Liverpool stands in the enviable position amongst the cities and towns of the kingdom of being unfettered as to the means she may employ to acquire insanitary property, either by compulsion or voluntarily. Contrary to all modern legislation, no obligation was placed upon the Corporation before demolishing property to provide accommodation for those displaced. The duty exists, however, although not legally imposed. So far some 500 houses have been bought by the Council at a cost of about 30,000*l.*, with legal charges of under 100*l.* Each house has cost about 62*l.*, as against 130*l.*, the cost under the operations of the 1864 Statute.

A fitting conclusion to this history of Municipal Sanitary Reform will be the mortality returns since 1847 :—

1847 to 1856	38·0	per 1,000
1857 ,, 1866	32·5	,,
1867 ,, 1876	29·3	,,
1877 ,, 1882	27·1	,,

Comparing the decennial period of 1841 to 1851 with that of 1872 to 1882, Liverpool has improved in her mortality returns by eight per thousand, as compared with four in Manchester and one in Salford.

I must now approach the more practical and, at the same time, the most difficult part of the question that we have to solve, viz. :—1. How to remove the present unsanitary property at a reasonable cost to the ratepayers and at the least inconvenience to the occupants. 2. How best to house the industrial classes for the future, without unduly competing with private enterprise. There are, as I have already stated, some 15,000 houses more or less unfitted for habitation by reason of their situation, containing a population of 60,000 people. As

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Dr. Trench says, no heroic remedy is possible; our work must of necessity be slow, but let it be constant if gradual.

To acquire this property, we must be prepared for an outlay of at least three-quarters of a million of money. For this expenditure we shall become possessors of about 350,000 yards of land, or upwards of 70 acres. If this area was divided into blocks of fair extent, a fair value would be represented; but the houses to be condemned are on comparatively small isolated lots, and of such a shape as to lead to much waste when regarded from a building-land point of view. Having removed the homes of so large a population, when and how are new homes to be provided? They certainly cannot be built on the same area if it is deemed essential to give each man his own front door. The smallest cottage house built under our present building regulations requires a minimum of 46 superficial yards of land, or 8,000 houses on the space occupied to-day by 15,000 dwellings; but this does not represent the full difference. For example, upon a site now in my mind, occupied by 132 dwellings, only 38 modern cottages could be erected. Thus, if regarded simply as a question of area, we cannot house those dispossessed on the single cottage principle. Further, the city is so built over that there is little available. Undoubtedly at the moment there is much cottage property unlet, but that can only be regarded as temporary, for the trade of the city and port is growing year by year, whilst its area available for dwellings diminishes. Another question for consideration here is the value of the land in the city. In the central districts, for example, 30*s.* per yard is a reasonable figure, and this means a cost of 69*l.* per house for the site.

I am, therefore, forced to the conclusion that if we are to provide for our present and future population near their work, the self-contained cottage principle must, to a large extent, be abandoned.

The system of building separate tenements in flats, so common and so popular in London, must be considered as a necessity also in Liverpool

There is another method of in part meeting the difficulty—particularly for our more immediate, and, therefore, more urgent. requirements—and that is to remove alternate blocks of court houses, to afford space and air to the remainder, and to make the rooms of two back-to-back houses a part of the one tenement, and so secure through ventilation.

A further suggestion has been made by an experienced man. It is to erect cottage homes with brick walls, pointing the brickwork on the inside, with a flagged ground-floor, and pitch-pine flooring on the upper storeys above; no plastering on walls or ceilings, leaving the rafters exposed. Such houses to consist of two rooms on each floor, and a stairway distinct from the rooms. I am assured they could be built for 60*l.*

Another scheme is to encourage building outside the city, and, by providing cheap means of locomotion, so spread the population. No doubt this is a wise and admirable suggestion; but however much benefit it may confer upon some, by far the largest number must be housed near the scene of their labour; one shilling per week for locomotion is a serious consideration. More important, however, is the time lost *en route* to and from work, extra cost of meals when not taken *en famille*, the difficulty of obtaining cheap food supplies, and the convenience to their employment for the children.

Before we can determine the merits of any or all these plans, we must have regard to the position and necessities of those whom we have to house. They are the poorest and most poverty-stricken in the community. Their present rental is rather under than over 3*s.* per week; and, even to meet this demand, more than one family occupies the same house.

A modern four-roomed cottage house in Liverpool costs the wholesale builder 80*l.*, and the land in the outer wards costs 40*l.*, or 120*l.* in all. A six-roomed dwelling costs about 100*l.* more.

The four-roomed house contains, on the ground floor, a living-room and kitchen combined, 12 feet square, with a small scullery in the rear. Above this are two bedrooms, one 12 feet square, and the other 12 feet by 9 feet. The rent will average from 5*s.* 6*d.* to 6*s.* 6*d.* per week, and if some of the inmates are children, six souls can at most be properly accommodated.

I need not describe the larger or six-roomed habitation, as its minimum rent of 7*s.* per week places it beyond the reach of the people whom I have now in view—in fact, the rent required for the smaller tenements is more than they can afford.

We have had in Liverpool some experience of houses built in flats. The Corporation, in 1868, built 146 tenements, called St. Martin's Cottages. Until the last month tenants have never been wanting, although I must admit some of the blocks are much shut in and gloomy. This is not surprising when we read Mr. Newlands' report of 1868, when, after a committee had deliberated four years, Mr. Newlands was forced to say:—'Seven sets of plans have been made to meet the changing views of the committee, who were steadfast to one thing only—viz., to get as many houses on the land as possible.'

They are divided into tenements of two, three, and four rooms. The living rooms are 12 feet 8 inches by 9 feet 6 inches, and bedrooms, one 13 feet by 8 feet, the other 13 feet by 6 feet 4 inches, with a scullery common to two houses. The rental of four rooms averages 5*s.* 6*d.*, of three rooms 4*s.* 6*d.*, and of two rooms 3*s.* 6*d.* per week—deduct from this a free gas supply, worth, I suppose, 3*d.* per week, and the rental is thus nearly 10 per cent. below the self-contained cottage of the same capacity.

In Ashfield Street a company, promoted by some of our leading citizens, has built 150 similar tenements; their charge until recently was slightly higher than the rent at St. Martin's, and they had several unoccupied dwellings, which, with a reduction of 5 per cent. in the rental, are now being tenanted.

I must once again turn to Nash Grove. Here the Corporation have, after four years' consideration, allocated 9,000 yards of land, on which the erection has commenced of 272 tenements on the block system. This is the most modern effort to provide houses for artisans, and as in their design, the City Engineer, Mr. Dunscombe, has had the benefit of a wide experience, I will describe them in some detail. The buildings themselves occupy only 3,200 yards of the site; the remaining acre and a half forms an inner quadrangle, which is intended for a children's playground. By way of comparison, I may mention that 270 cottages built according to the ordinary building regulations, would have a combined open yard space of under 5,000 yards, and this would be broken up by partition walls into lots of 150 superficial feet each. I need not say how much more

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effective will be the unobstructed ventilation of 6,000 yards in one clear space. The buildings will form thirteen blocks, each entered from the quadrangle, fronting streets on one side of 45 feet, another side 60 feet, a third 45 feet, and the other 30 feet in width.

They are to be five storeys high, with twelve shops on the Cazneau Street frontage. A common stairway, 8 feet wide (2 feet wider than usual), covered, but open to the air, gives access to each block. On each of the four lower storeys there are two three-roomed dwellings and two of two-rooms. The top storey contains four single-room tenements and two of two rooms. A fitted-up laundry is provided on each landing, which will be allotted on fixed days in each week to the sole use of one of the four tenants on the landing. On every landing there are also sculleries and water-closets, each common to two tenants. All stairs and passages are fire-proof. The rentals are fixed at 5*s.* 3*d.* per week for three rooms, 4*s.* 3*d.* for two rooms, and 2*s.* 9*d.* per week for one room. The cost, excluding the value of the land, will be 55,000*l.*, and the net income on this cost is estimated at 5 per cent.

The accommodation in the more recent Peabody dwellings consists of two three-roomed dwellings and two two-roomed on each flat, with a laundry to each landing; sculleries and water-closets for every two tenants. The rent of the three rooms is 5*s.* 9*d.* per week, and the two rooms 4*s.* 6*d.*, with a superficial area of 134 feet. At Nash Grove, the area for a similar number of rooms being 155 feet. The general return from the dwellings to the Trust is 3 per cent., and the average rental is 2*s.* 1*d.* per room.

The rentals of the other London industrial dwellings would form no guide for us, as they are far in excess of what our labourers could pay, being more or less commercial undertakings, 3*s.* per room being frequently charged, with scullery. I should also add that the superficial area of the rooms ranges from 106 to 116 feet. It may be remarked that the Peabody dwellings are the only ones in London that have a sufficiently high sanitary standard.

The earliest experiment in the block system of building workmen's dwellings, that I am aware of, are the Dock Cottages, at Birkenhead, built by a company in 1845. They contain 324 tenements, and stand upon an area of about the same extent as Nash Grove with its 272 dwellings, and, being built in rows, the ventilation is much less efficient. Each tenement consists of a living room, 13 feet by 9 feet 9 inches, one bedroom 9 feet 6 inches by 6 feet, and one of 9 feet by 7 feet. The rents are remarkably low, 75 letting at 3*s.*, 73 at 2*s.* 9*d.*, and 76 at 2*s.* 3*d.* per week, according to elevation and position; a few are even lower. 250 out of the 324 are occupied, and, by the Dock Board accounts, yield a net income of 828*l.* As to the cost of the buildings there is no record.

In Manchester a successful effort has been made by a company to provide two-roomed tenements in semi-detached houses three storeys high, each storey forming a separate tenement. The cost, excluding land, has only been 78*l.*, and the average rental is 2*s.* 6*d.* per week.

I must now turn to the economical aspect of the question. In Liverpool there is an excessive supply of labour, and in consequence employment is in far too many cases casual. The ordinary dock-side labourer, for whose position we have more especially to provide, earns 4*s.* to 4*s.* 6*d.* per day, but the average weekly earnings of this class does not, I believe, exceed 15*s.* If his work was constant he could better afford 4*s.* 6*d.* to 5*s.* per week rent, than he can now raise his share of 2*s.* 9*d.* for a court house. It is a moot politico-economic problem, whether if we improve house accommodation out of the public purse, thus making rents abnormally low, we shall induce increased numbers to come to the town, and so increase the present over-supply of labour. If we were free to act as we pleased, I should pause to weigh well this phase of the question. As it is, however, we have the people living in unwholesome dwellings, and they must be removed. The problem to be solved is how best can we accommodate the industrial classes at a rental of one shilling per week per room. This shilling rental is the all-important factor, for no man with a family ought to occupy less than three rooms, and 3*s.* is as much as the average Liverpool workman can afford to pay; 3*s.* per week returns 5*l.* per house per annum to the owner, and no private person will build cottages costing 150*l.* upon such a return. The Ashfield Street dwellings have averaged a return of a little over 4 per cent. during ten years; their lowest dividend was 3½ per cent. earned last year. They cost 22,000*l.*, or 51*l.* per room. St. Martin's Cottages cost 17,800*l.*, including 3,000*l.* for land; the net income has averaged 4*l.* 6*s.* 8*d.* per cent. per annum; last year it was only 3*l.* 10*s.* per cent. They were constructed on an estimate to pay 4 per cent., but faulty construction, and the closing of basement accommodation, has reduced the earnings. About one-half the tenants change their place of residence every year.

As in some minds a prejudice exists against dwellings erected in flats and large blocks, a word or two upon this point at this stage will not be out of place. Overcrowding is the general character of the objections raised. Undoubtedly it is one of the greatest evils with which a sanitarian has to contend. It is commonly supposed that because a given number of persons live upon a certain space, such aggregation must be unhealthy. This is a fallacy. One thousand persons may live in the best of health upon an acre of land, if housed according to approved sanitary regulations, whilst 500 persons may live upon an acre without these precautions, and to them it will mean disease and excessive mortality. I cannot better illustrate this than by pointing to the highly satisfactory condition of health in the London block system and at the Birkenhead Cottages. The birth-rate amongst the 14,500 persons occupying Peabody dwellings was, in 1882, 45·04 per 1,000, or, 10·74 above the average of London. The death-rate was only 18·42 per 1,000 in the dwellings, or, 2·98 less than the London average—the infantile mortality being 13·59 below the average in London. At the Birkenhead Cottages, which are by no means a favourable type of building, and where the character and occupation of the population is similar to those in Liverpool, the death-rate in ten years has only averaged 18 per 1,000. Their population is about 1,000 per acre. The total death-rate in Scotland and Vauxhall Wards was last year 33·50 per 1,000, or equal to a loss of 1,250 lives, judged by the standard of the Peabody dwellings. Such figures are a sufficient answer to those who cavil at the block system of building. Typhoid fever, once so prevalent in Liverpool, has almost disappeared. As this fever is due to drainage

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and fœtid smells, its cessation is testimony to good public sanitary works. Typhus fever, on the other hand, is sadly prevalent. It spreads by contagion, and, as already shown, the court houses of Liverpool, crowded by different families, might have been built to propagate fever when once it enters their doors. Isolation is the only check to its spread, and this cannot be had in such abodes. Our object should be to discourage the all-prevailing system of sub-letting houses by the rooms. True, we have legal powers to regulate them, and no less than 15,000 are in the registers. It is better, however, to provide single tenements at a cheap rent rather than that tenants should strive to pay a high rent by sub-letting, and the corporation, as landlords, can better enforce such a condition than can individual owners. As regards the height of block tenements, it is found in London that the upper floors have the preference.

Legislation relating to unhealthy dwellings is scattered over so many Acts of Parliament that an abstract of the powers they confer upon local authorities, in addition to those I have already quoted, may be useful. An Act passed in 1851 empowers a council to erect lodging-houses. The Labourers' Dwellings Act of 1866 authorises the Public Loan Commissioners to advance money to corporations for the purpose of erecting such buildings or adapting buildings for the purpose. Under the Artisans' Act of 1868, amended in 1879, a medical officer may report houses as unfit for habitation, and order demolition or alteration, and the local authority may require them to be so dealt with. Should, however, the owner object to conform to the order, the local authority are required to purchase the property.

A house may be compulsorily closed to habitation if it is unhealthy by reason of some defect inherent in itself; but no power exists to close a dwelling by reason of its location rendering it insanitary. An Act passed in 1874 authorises a corporation to grant leases of its land for the erection of workmen's dwellings.

It now only remains that I should summarise my remarks, and indicate the policy that ought, in my judgment, to be adopted in Liverpool and other towns similarly situated, in order to improve the dwellings for the industrial classes :—

1. There are at least 12,000 to 15,000 dwellings that must sooner or later be dealt with, inhabited by 50,000 to 60,000 people, situated mainly in the 2,300 courts still remaining in Liverpool, containing back to back houses.

2. That the work of demolishing old property must be gradual—even slow—until an adequate number of improved dwellings are ready for occupation.

3. That two new dwellings for every three removed ought to be provided. This proportion will prevent undue competition with private effort.

4. That the rent must be on the basis of a shilling per room per week.

5. That the occupation of one tenement by more than one family should be discouraged, except where there are a limited number of children, when a lodger may be allowed.

6. No uniform plan can be followed as to the mode of providing the requisite accommodation, various arrangements being necessary, to be determined case by case. For example :—

On large areas tenements in flats are best adapted.

On smaller blocks cheap self-contained cottages can be erected with advantage.

The present front houses to courts may in some cases remain, the rear court houses being removed to afford ventilation.

Where desirable, alternate courts to be demolished, and the remainder remodelled and generally improved, especially as regards ventilation.

7. The Corporation should so arrange that the tenants of the self-contained houses may, by payment of an extra rental, become the owners after the lapse of a certain period.

8. Legislation is required to prevent the occupation of houses when, by reason of their location, they are unhealthy dwellings.

9. So far as an estimate is possible, I calculate the expenditure for the land and buildings at 750,000*l.*, and that to provide or rearrange the accommodation for two-thirds of those displaced will cost 660,000*l.*, or a total of 1,410,000*l.*, as shown in the following statement :—

12,000 insanitary dwellings, to be removed or improved, costing, including sites, say		£750,000
Cost of accommodation in part substitution of houses removed, say—		
2,750 three-roomed tenements on the flat system, at 150*l.* each		£412,500
2,750 cottages at 60*l.* each		165,000
2,750 existing tenements remodelled, at 30*l.* each		82,500
		£660,000
Rent of 8,250 tenements at 3*s.* per week		£64,362
Less interest at 3½ per cent.	£23,100	
Sinking fund	3,330	
Rates, repairs, and loss of rent	22,500	
		48,900
Surplus		£15,462
The annual interest and sinking fund on the cost of sites, and for property demolished, would be		£30,000
From which deduct surplus rental		15,462
Leaving an annual loss to the Corporation of		£14,538

Or a little over 1*d.* in the £ on the rates.

Such a loss would, however, be more apparent than real, for the gain to the town in health means reduced poverty, diminished drunkenness, better labour in return for wages paid, and, above all, a feeling in the heart and soul of each of us that we have done something in our day and generation to ameliorate and to raise the condition, spiritual, social, and temporal of those in poorer circumstances than ourselves.

[As a sequel to the above it may be noted that at a recent meeting of the Liverpool City Council, a lengthy discussion took place on the subject of the demolition of insanitary property, with the view to the improvement of the health of the low neighbourhoods and ameliorating the condition of the labouring classes and the poor. The Insanitary Property Committee submitted a resolution to apply to the Local Government Board for a provisional order for increasing the borrowing powers of the Corporation by 200,000*l.* in view of an extensive demolition of insanitary property which is in prospect. Mr. A. B. Forwood moved the adoption of the recommendation, and a vote being taken it was carried by 34 to 5.—ED.]

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THE REHOUSING OF OUTCAST GLASGOW.*

By J. H. STODDART.

Editor of the 'Glasgow Herald.'

LORD SHAFTESBURY was well within the truth when he stated in the columns of the *Pall Mall Gazette* that the pestilent slums of Glasgow had been entirely swept away under the operations of the City Improvements Act, which became law about seventeen years ago. Only those who like Lord Shaftesbury have visited some of the plague spots, some of the dens of vice and crime and wretchedness, which existed then within an area of about sixty-six acres, comprising a population of from 120,000 to 150,000 human beings, can thoroughly understand the beneficent change that has now been effected, and the sanitary and moral good that has been accomplished by the city authorities. There is nothing in London in its very worst parts that would not compare favourably with the network of wynds and closes, only to be threaded at night by thieves, abandoned women, and policemen, which was then characteristic of the central and other portions of Glasgow. Twenty years ago, as a matter of professional duty, I spent a whole night in exploring these dark regions. The horrors of that night can never be forgotten. There were closes running deep into great piles of high buildings, into which the sunlight scarcely ever penetrated even in summer, where every breath of air was tainted before it reached the closely packed inhabitants, where the gutters reeked with filth, and the rooms visited could only be entered by holding a handkerchief close to the nose. Many of the closes branched out in various directions, and had half a dozen exits, while others were simply narrow blind alleys. They were teeming with population, composed of the lower class of workmen, the criminal, and the vicious. Lodging-houses of the most wretched character, well named 'rookeries,' abounded, and were filled every night from floor to ceiling with hundreds of the poorest and most degraded of human beings, male and female. Fever was never absent from these places. The death-rate was frightful; the destruction of infant life perfectly appalling. Did space permit, I could give statistics of mortality in these lower districts of Glasgow of which nothing is known in underground London, where Mammon collects his rents. Well, these wynds and closes, as Lord Shaftesbury has explained, have all been abolished, and with them the horrors of life, which can never be revived surely, either here or anywhere else. Glasgow is very far from being a model city so far as the housing of its poorer classes is concerned, and the working of the Improvement Act has not been so beneficial as it might or ought to have been; but at all events it has extinguished a vast mass of buildings that as habitations were a disgrace to humanity.

The City Improvement Act, promoted by the corporation, proposed at first to deal with property of the value of one and a quarter million sterling. The first incentive to this great scheme was the construction of the City Union Railway, which touched at some points several of the lowest portions of the city, displacing about 10,000 of the population. These poor people had to find accommodation where they could, which happened at the time not to be difficult, for speculative builders were busy all over unbuilt spaces in the town and on the boundaries. The displaced population generally found better houses at a higher rent; but the first result was to still further overcrowd the already far too overcrowded closes and wynds. The corporation was bound to do something, and the result was the improvement scheme, carefully prepared by Lord Provost Blackie and the city architect. The corporation obtained powers to purchase and sweep away the infamous wynds and closes, to construct new streets, to make open spaces, and to buy a park for the north-eastern portion of the city. To defray the expenditure consequent upon such a large demolition of property, powers were obtained to levy a maximum tax of sixpence per pound on the rental for five years, and threepence per pound for the next ten years, in which time it was believed all the operations under the Act would be completed. One important provision of the Act Lord Salisbury has referred to—the obligation on the corporation not to displace more than 500 people without having previously provided homes for them elsewhere. It is possible that some misconception may have arisen from the manner in which his lordship refers to this obligation, as will be seen further on. The trustees under the Act had naturally to proceed very cautiously in the purchase of the old properties. A much larger portion was scheduled than was required for improvement purposes, and as the property owners in most cases did not know what portions were absolutely needed, and what not, and often were unaware of the real purchasing till a bargain was struck, the whole was gradually acquired at not unreasonable figures. It took some years before the work of demolition could be begun, and it is not yet quite completed. Of course all the very worst habitations were first pulled down, and up to the present moment about 50,000 persons have been turned out of their old filthy homes. Including those displaced by the railway companies there have thus been about 22,000 families or 60,000 individuals removed from the area of the improvement operations to other portions of the city and suburbs. How was this accomplished? The answer is, By the speculative builder. There never was a time during the period of demolition that there were not far more of the class of houses required for the displaced people than they could occupy. On this point the corporation satisfied itself thoroughly, but it was content simply with the return of empty houses. The improvement demolitions gave a great impulse to the building trades; property rose in value, and for a time the corporation was able to sell the ground acquired by it at high prices. The buildings erected on the old steadings were not houses for the poorer classes of workmen, but shops and warehouses, so that this quarter of the town has been almost entirely transformed. This unquestionably was a mistake. The shops have not flourished, for the population was gone which would have supported them, and at present there are many of these fine new buildings without tenants. As there was no municipal control over the migration of the 10,000 families displaced, it was inevitable, considering their character, that they should find homes in places superior only to those that they had left. Overcrowding was the result in some quarters of the town, and it still exists in spite of police regulations and the severity of the city magistrates. Why, it may be asked, did not the Glasgow Corporation s

* Reprinted from the *Pall Mall Gazette* of Nov. 28.

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an example to builders by erecting healthy and cheap houses for workmen? There were economical reasons against this course, though it was repeatedly urged both inside and outside the town council, and it is a pity that a real attempt was not made upon a definite plan, even supposing the experiment had not been successful in a pecuniary sense. A model would have been supplied to builders and probably a taste created among the lower working classes for a better class of home than is yet supplied to them anywhere in Glasgow. When this question was under discussion the Improvement Trustees made an effort to follow the displaced families to their new houses. The statistics were far from being complete, but they showed that higher rented and better houses were, upon the whole, occupied. There was, in fact, a compulsory payment of higher rental, and a compulsory occupation of healthier dwellings. Rents rose all over the city while the operations under the Act were going on, in consequence of the increase in the value of property, to a large extent fictitiously raised by rings of speculators. For the last few years house property has been greatly depressed, and rents have proportionately fallen. It will thus be seen that the rehousing of the outcast poor in Glasgow was wholly effected by the speculative builder, who supplied the outcasts with better houses at a much enhanced rental.

THE HOMES OF THE POOR IN DUBLIN.*

By C. A. CAMERON, M.D., F.R.C.S.I.

Sanit. Sci. Certif., Camb, &c., &c. &c.; Medical Officer of Health for Dublin.

A CENTURY ago the eastern parts of Dublin were occupied chiefly by the wealthy classes, whilst the central and western quarters were inhabited by the middle and respectable artisan classes. In those days there were no extensive areas as there now are, wholly peopled by the miserably poor, earning scanty wages, often waiting for their breakfasts until they can earn or beg the price of it. The aristocracy have fled from Dublin. In 1788 twelve peers and fourteen members of Parliament had permanent residences in Upper Sackville Street; now there is not a single resident nobleman in Dublin. The houses of the aristocracy have passed into the possession of lawyers, medical men, and merchants; and the houses formerly occupied by the middle sections of society have for the greater part become tenement houses. Owing to these causes, and the slow growth of Dublin, the people now reside in very old houses, which for the greater number are altogether unsuited to the condition of their present tenants. In 1881 there were 24,211 inhabited houses in Dublin. In 1882 I had a survey of these houses made, the results of which showed that there resided in 7,234 of them no fewer than 32,202 of the 54,725 families living in Dublin. The houses contained 48,116 rooms, or not quite one room and a half per family. I have ascertained that 100 married labourers, earning on the average 17*s.* 6*d.* weekly, pay an average weekly rent of 2*s.* 1¾*d.*, for which on the average they enjoy the luxury of 1·28 room! In these dwellings people of all ages and both sexes are huddled together in a single room. One apartment is often used as a workshop, a kitchen, a living room, and a sleeping room by a large family. According to the law, 300 cubic feet of space must be provided for every person; but still a man, his wife, and three children may legally reside in a room 15 feet long, 10 feet wide, and 10 feet high.

The sanitary authority has recently made great efforts to improve the condition of the tenement houses. The streets in which they are situated have been to a great extent paved with Welsh setts. Every morning their yards, &c.. are cleansed by the cleansing department of the corporation. Great pressure has been put upon the owners to repair and remodel them. Since Sept. 1, 1879, 1,571 of them unfit for habitation have been compulsorily closed, and although most of them have been put in order and reopened, several hundreds have been permanently closed, chiefly on account of unimprovable conditions of site. As Dublin is suited for the water carriage system of filth removal, the owners of tenements have been pressed very much to adopt this system. The corporation have recently procured from the Treasury a loan for the purpose of reconstructing the sanitary accommodation of tenement houses which require such, but the owners of which are unable or unwilling to effect the improvement. The cost will be made a charge upon the houses. I have long urged the necessity for the erection of dwellings for labourers by the corporation, by whose action so many unsanitary houses have been detenanted. A scheme for the erection of a block of such dwellings at an estimated cost of 25,000*l.* has been adopted by the Public Health Committee, and I trust that the great influence which the chairman of the committee—Mr. E. D. Gray, M.P.—possesses, will be used in securing for the scheme the assent of the municipal council.* Hitherto the corporation have been demolishing old unhealthy houses; henceforth, I hope they may become builders of healthy homes for the poor.

The corporation have cleared two 'unhealthy areas.' The 'Coombe area' comprised four acres, and contained 110 houses, in which 984 persons resided in 320 tenements. The property was acquired at a cost of 143*l.* 16*s.* 7*d.* per house; but the entire cost of the undertaking, including road-making and sewering, was 24,000*l.*, or 6,000*l.* per acre. The area is let to the Artisans' Dwellings Company at 200*l.* a year only; but the greatly increased rateable valuation of the area has added largely to the corporation revenue derived from it. The 'Plunket Street' unhealthy area will cost, when completed, 27,000*l.* It comprises 3 acres, 2 roods, and 22 perches. It contained 159 houses, in the 420 tenements of which 1,619 persons resided. The houses were acquired at an average cost of 120*l.* 4*s.* 5*d.* The Dublin Artisans' Dwellings Company were formed in 1877, and laid down upon what may be termed economico-philanthropic lines. Their capital is 100,000*l.* of which 70,000*l.* has been subscribed. They have borrowed 16,000*l.* They have built 544 dwellings upon nine acres, and their tenants and families number 2,700 persons. When operations nearly completed and about to be commenced have been concluded, the company will have 1,004 dwellings situated on twenty acres, and affording accommodation for 6,000 persons. The dwellings are good value for the rents, which vary from 2*s.* to 8*s.* weekly, and average 4*s.* 6*d.* Mr. E. C. Guinness,

* Reprinted from the *Pall Mall Gazette* of Dec. 4.

* Since the foregoing was written the Municipal Council, with not a single dissentient, adopted the recommendation of the committee.

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the eminent brewer, has erected dwellings for the accommodation of 70 of his workpeople. They consist of three-storied and two-storied houses; the tenements include a living-room, from two to three bedrooms, a scullery, and a water-closet. The rents vary from 3*s.* to 4*s.* 6*d.* Mr. Guinness, satisfied with the result of this experiment, is now building dwellings for 500 families.

When I add that the Industrial Tenements' Company have built a block of dwellings for workpeople, and that Mr. Vance, a private gentleman, has converted a large number of old houses into improved dwellings, I have shown everything of a substantial nature which has been done to improve the homes of the poor in Dublin. There is, however, a section of the people for whom nothing has been done in this city, or perhaps elsewhere—I mean the very lowest stratum of the population, who pay from 10*d.* to 1*s.* 4*d.* per week for their miserable lodgings. It is in their dwellings that the fires of the fevers smoulder—ever and anon bursting into flame and spreading forth, carry disease and death into the homes of the rich. Should philanthropic persons provide healthy dwellings for this unfortunate class it would certainly be politic to exempt them from local taxation.

LODGING-HOUSES FOR THE POOR AS AN INVESTMENT.

By F. B. WINTER.

NOW that the question of the housing of the poor is being so much discussed, and the newspapers and magazines are constantly calling attention to the miserable condition of the lower classes of our fellow-citizens, the above subject should be of particular interest, for there is I think no doubt that could the necessary reforms be made on a commercial basis, and yield a fair return to people using their money in this direction, the solution of the question would be far easier.

With many of the wretched cases of which we read I fear such a solution is out of the question; the poor creatures have sunk to such a low condition that, as Mr. G. R. Sims says in one of his forcible articles, 'they would turn Buckingham Palace into a pigsty.' There is, however, a class which has not yet reached the very bottom, and with whom there may be more hope of dealing with some degree of success; and it is to a section of this class that this article refers. It is well known that most of the model dwelling-house companies do not encourage single men to become lodgers; these men are consequently driven to live in what are called 'lodgings,' with another family, that is, in many cases, in one corner of a room already occupied by a married couple and a few children of various ages, a circumstance certainly not tending to raise their moral nature; or they have to find accommodation in one of the common lodging-houses of the slums, where they are corrupted and dragged down lower than before by the enforced association with 'thieves and loafers' who frequent these dens.

If 'lodging-houses as an investment' can be made to yield a fair rate of interest, surely this branch of the great evil can soon be remedied, with the result at the same time of lessening the evil in other ways by reducing overcrowding. That common lodging-houses or licensed lodging-houses—by whichever name it is preferred to call them—can be made to pay under respectable and decent management is a proved fact, and I cannot perhaps do better than refer to a house which I now work in conjunction with another gentleman. This house is devoted more particularly to seamen and dock labourers, and so far promises to be a successful undertaking. We have a coffee and eating-house conducted as a temperance house in front, with managers' rooms over. This is of course not necessary, though I think it is a beneficial part of the work. In the rear is a large building, formerly a factory, which has been fitted up as a lodging-house and is duly licensed as such. In the basement is a general kitchen, with a fire at which the lodgers can cook any food they bring. The ground floor is divided into small rooms on the cubicle system, with a washhandstand and bed in each. Some of these are larger than others, being intended for married couples; others are also intended for single women, but these we do not find to fill except occasionally, when we have in a batch of German or other foreign emigrants who are passing through London; and we propose to alter them into rooms for single men only, charging 1*s.* per night, or 4*s.* 6*d.* per week (if paid in advance) for the larger rooms, and 9*d.* a night, or 3*s.* 6*d.* per week for the smaller ones. The regular lodgers paying 9*d.* or more a night will also have the use of a sitting room just formed on the ground floor. On the next floor are similar 'cubicles,' which are let at 6*d.* and 9*d.* per night, Sundays being given free, or 2*s.* 6*d.* and 3*s.* 6*d.* per week if paid in advance. On the top floor is a large dormitory with beds, which are let at 4*d.* per night, Sundays free, those occupying 4*d.* and 6*d.* beds having the use of a general lavatory. The total number of beds is, I think, over 140, and the total possible weekly rent taken at the lowest of the above prices is about 15*l.* The present takings are nearly 11*l.* per week, but this we hope largely to increase when we get rid of the women's rooms. The property is held by the owner under a long lease at a ground rent of 12*l.* I and my co-owner hold simply a two years' agreement with the option of purchase at about cost price (5,000*l.*).

Experience is better than theory, and I therefore refer to the place I actually know the working of; and for the information of any who would think of starting a similar enterprise or would join with us in extending the present, I append a statement of one year's estimated trading which I have put low so as to be on the safe side.

The eating-house takings average now over 5*l.* per day, say, however 28*l.* per week, making 1,456*l.* per annum; 30 per cent. of this is gross profit		£436
The lodgings at lowest prices should produce per annum	£780	
Deduct 20 per cent. for empties, &c.	£150	630
		£1,066

The payments are :—

Ground rent and insurance	£130	
Interest on 2,000*l.* mortgage at 5 per cent.	100	
Rates and taxes	100	
Gas and water	65	
Wages	250	
Coals and sundries	100	745
Balance		£321

7 per cent. interest on 3,000*l.*, the balance of

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purchase money, would take 210*l.*, leaving still 111*l.* to fall back upon as a reserve fund.

The above figures are stated from actual working, except as to the lodgings, which produce at present about 570*l.* a year instead of 630*l.*; but this is provided for in the 111*l.* balance, still leaving a margin equal to over 7 per cent., and this out of a lodging-house with beds let at prices equal to 4*d.* 5*d.* 6*d.* 7*d.* and 9*d.* a night, and Sundays given in free! Surely this justifies the heading of this article—'Lodging-houses as an Investment,' and should encourage others to help in grappling with this part of the evil on a simple commercial basis; many are quite satisfied with 5 per cent. interest, this shows 7 per cent.; is not this sufficient encouragement?

THE NATIONALISATION OF WATER SUPPLY.

By a Medical Officer of Health.

In considering various propositions that have lately appeared respecting the necessity of an increase of State control over the land of thiscountry, some important offshoots of the question appear to have been overlooked. The distribution and development of our national wealth in minerals, and the utilisation of our natural supplies of water seem at present to be inseparably bound up with the rights and wrongs of our system of land tenure. Confining our remarks to points in connection with sanitary administration, let us see how our land laws affect the question of procuring pure water supplies for the people.

Every one who has had any experience in providing this first necessity of healthy life must have been grieved at the many hindrances and expenses that have to be met, in consequence of the claims of private ownership. In theory the law of England may not exactly recognise the absolute right of any one to ownership in water; but in practice the lord of the soil through which the water flows can almost dictate his own terms before the public can be allowed to partake of that which costs him nothing. However little use the landowner makes of a spring of water, he may, like the dog in the manger, simply decline to allow any one to touch it, if he is so minded. Occasionally a generous landowner recognises the justice of sharing the gifts of heaven with his neighbours, but too frequently, where a public supply is required for town or village, the necessity of the community becomes the opportunity of the landowner. He knows that by the law of England the soil adjoining a spring or stream cannot be disturbed without his sanction; and for this sanction he can claim any amount he likes for damages or compensation. Although the agricultural and letting value of the portion of land required, for reservoir or tank, may be less than twenty shillings, and thirty years' rent would fully equal its selling value, any community is fortunate which secures what it needs on paying three times, or even five times, that amount. Read the record of the enormous sums that sanitary authorities have been compelled to pay for land rights, water rights, &c., under the heads of value of land and compensations; and it must be owned that the terms exactions and extortions would seem more justly to describe the character of the amounts paid for that heaven-provided water which landowners claim as part of their private inheritance. In recent years many instances of selfish monopoly and extortion have been met with in connection with schemes of water supply, devised by sanitary authorities for improving the health of the people. In almost every country newspaper, complaints are found of defects in respect of this or that water supply, and of the exacting demands of landowners who, with a monopoly of the land, claim also a monopoly of the waters on or under the earth. It is ridiculous to talk of freedom of contract in such cases where, on the one hand, the element of water is a necessity for the people, and, on the other, the supply is an absolute monopoly of the landowner. It may be said that our laws provide compulsory powers and arbitration, where questions of this sort cannot be settled by agreement. Theoretically these proceedings would seem to offer a just and happy solution of all disputes and grievances, but practically local authorities have found the process vastly expensive and cumbersome. They are almost invariably saddled with enormous costs, and professional valuers have become so expert and ingenious in creating fictitious values, costs, and claims, that sanitary authorities find it cheaper to pay the fixed demands of the extortioner, rather than risk the elastic award of the arbitrator. The municipal deputation that lately waited upon the President of the Board of Trade with reference to the appointment of arbitrators for assessing the value of land acquired for public works, streets, &c., might properly have included in their representation the abuses and evils that have sprung up in connection with schemes of public water supply. Let it be remembered that the source of a water supply acquires none of its value from the enterprise or labour of the landowner, but depends solely on the health necessities of the community near it, and it becomes very difficult to conceive that the present state of our laws respecting water rights, when considered in reference to the need of pure water supplies for the well-being of the people, are either satisfactory or politic.

Popular Sanitary Lectures.—Miss E. Barnett, lecturer to the National Health Society, has returned from a tour in the North of England and Scotland, where she has been lecturing for the Society to large audiences of working men and women at Glasgow, Workington, Liverpool, Bradshaw, Keswick, Bolton, and Astley Bridge. There is every reason to believe that these lectures are much appreciated by the class of people for whom they are intended, and that their taste for knowledge of the laws of health is much increased. If a due comprehension of the unsanitary conditions under which they live can be aroused in the poorer classes, these lectures will not have been delivered in vain.

A Public Mortuary for Camberwell.—The vestry of St. Giles, Camberwell, have decided to build a public mortuary for Camberwell in St. George's churchyard, Wells Street, on the banks of the Grand Surrey Canal. The building—which will comprise a mortuary, board room, a room for *post mortem* examinations, and an office—will be of very plain construction, and the cost is not to exceed 650*l.* When completed, the structure will provide a long-felt want in Camberwell, as the present mortuary accommodation at the workhouse in Havil Street is very inadequate. It is understood that the new mortuary will only be used for non-pauper cases.

Going Circuit on the Bicycle.—Some medical men are a little shy of using bicycles and tricycles for fear of hurting their professional dignity. In Australia it has attained judicial honours. Justice Williams travels circuit on a bicycle. Recently he was met eight miles out of Ballarat by the Bicyclists' Club, and gave them a smart run, although he had travelled over fifty miles.

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TENURE OF OFFICE OF SANITARY INSPECTORS.*

BY EDWARD S. MAY,

Sanitary Inspector, Ramsgate.

IT will be unnecessary for me to refer in detail to the various Acts of Parliament and Orders relating to the appointment of Inspectors of Nuisances, as these are well known to most officers.† What I purpose doing is to refer to their 'tenure of office,' and also how, and in what manner, officers are affected by the latest General Orders issued by the Local Government Board, dated March 10 and 13, 1880.

Article 9, of March 10, refers to the urban inspectors. It provides that 'Every officer shall continue to hold office for such period as the sanitary authority may, with the approval of the Local Government Board, determine, or until he die, or resign, or be removed by such authority with the assent of the Local Government Board, or by the Local Government Board.' The fourth clause of Article 6 provides that: 'In the case of any officer who holds his office for a specified term, the sanitary authority *may* provide for the continuance of such officer, or appoint his successor within three calendar months next before the expiration of such term.' Thus it is quite optional with the authority, who may appoint another person to take the office of the inspector before such term really expires. To my mind the 'Order' gives local authorities the power to do as they like with an officer, good, bad, or indifferent. Thus, after receiving an appointment, an officer finds himself completely in the power of the authority, or, at least, some of its members. And what is the result? I will endeavour to point out.

I trust it will be understood that the following remarks are made with the view simply of opening up a discussion on the question of the 'tenure of office,' and of giving vent to a grievance, not only affecting ourselves, but in the result, seriously detrimental to the public. Further, these remarks are made with the hope, which the writer has in common with all his brother officers, that at no distant date a reform in the mode of appointment of all sanitary officers will be effected. How this is to be accomplished is a matter worthy of our consideration. For the present my opinions may be of little value, but like a house well drained or a sewer well laid and constructed, this subject will lose nothing by being 'well-ventilated.' Not only is it a subject for our own consideration, but in the interest of the community at large, is one also that seriously demands, and requires to be brought fully and prominently under the notice of the President of the Local Government Board.

The appointments of registrars of births, deaths, and marriages, of relieving officers, of school attendance and inquiry officers, of vaccination officers and many others, are of a permanent character. Having myself held four of these offices, I am fairly puzzled to find a reason why a distinction, or exception should be made in the case of sanitary officers, who have far more onerous, serious and unpleasant obstacles to encounter in the discharge of their duties than any of the before-mentioned officers, and ought therefore to be placed at least on an equal footing with them as regards tenure of office.

What are the arguments then that may fairly be adduced in support of our wishes and desires that our appointments may be made secure and permanent?

1. The anxiety and worry continually felt while endeavouring fearlessly and faithfully to discharge our duties, that at the expiration of the term of our appointment we may be dismissed. We feel that our services are unrecognised, that the more we gain in experience, the more we become familiar with sanitary laws, the longer we study sanitary science, and are making ourselves more and more efficient for the office, the more surely are we approaching the time when, in the parlance of the so-called economists, our 'services are no longer required.' We have been for some tastes too energetic, too particular, too zealous, too officious and interfering (especially to small property owners), so that our services may be abruptly terminated and our post taken by another, who may not be possessed of such disagreeable qualities. It may be argued that a good officer has no fear of not being re-appointed at the end of each term. This may apply to some authorities who, acting conscientiously, are desirous to retain an efficient officer, but there are exceptions, or why do we so often hear of some good officer being superseded? These observations apply more particularly to provincial officers, as the writer is informed that the metropolitan officers are, with few exceptions, appointed permanently. It is obvious then, that in the metropolis at least, sanitary officers are free to discharge their duties in a more fearless and independent manner than their provincial brethren.

2. A sanitary officer, in the discharge of his duty, is, unlike the soldier, always in battle. The enemy he attacks is ever on the alert; and there are no traces to give the pursuer breathing time. This enemy, as you all know from experience, is zymotic disease, which we are always striving to destroy or render harmless. But with our hands shackled and trammelled, in a way so galling to the conscience, so injurious to our sense of right and truth, so impeding to the freedom and heartiness of our actions, how helpless the task appears at present! The time will come, however, when, as Dr. Richardson says, 'disease will be put down as unsparingly and as fearlessly as a judge or magistrate puts down crime.' An experienced doctor once said to me, 'he would as soon face the bullets on a battlefield as come in contact with small-pox infection, malignant fevers, or the deadly sewer or cesspool gas!' The least reward that could be offered for the danger to which our calling exposes us is that our services should be permanently retained, so that we could feel encouraged to do our duty, and free from the risk or personal anxiety of being dismissed for good service.

3. The public for whom we labour, in whom we take deep interest (far more than sometimes they take for themselves), who have become, as it were, our teachers, and got us into good training, have they not some right or claim to the retention of our services when we do well? Are we not public servants in every sense of the word? It cannot be right that the public should be suddenly deprived of the services of an experienced public servant simply because his appointment was only made for a term,

* A paper read before the Association of Public Sanitary Inspectors, Dec. 1, 1883.

† This subject will be found to be fully dealt with in the SANITARY RECORD for April 15, 1883, p. 446.

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4. While the tenure of office is so uncertain, it opens the door to the admittance of men who may not be well qualified for the post, men who for the sake of retaining an appointment may wink at, or pass over glaring evils, so that particular members may be induced to give them their votes and interest at their re-appointment. In provincial towns of small size it must be apparent, from the mixing up of private interests, that the sanitary officer, like other human beings not in a position of independence, if he values his office and is not too conscientious, is tempted to secure his re-appointment by a too lenient dealing with evils that urgently call for remedy. If an officer studies his own interests and desires to secure his re-election, he may work in accordance with the direction of the wind. In other words, he must pander to the schemes and whims of his masters, and sacrifice his better feelings and self-respect, because he may have a family who are depending upon him for everything. But surely such a state of things ought not to be allowed to exist or continue. It must be obvious that with all this clashing of private interests, which now is so difficult to contend with, and is so harassing to an officer, that he should above all considerations hold a permanent, secure, and independent appointment, so that he can act fearlessly, disinterestedly, and independently for the public good. It is quite a common occurrence, after action has advanced to a certain point, in procuring the abatement of a nuisance, or in getting some necessary alteration or amendment made, to find oneself checkmated by the very persons in authority who, ever mindful of the votes and not the voters, have themselves given their sanction to the necessary preliminary legal proceedings.

5. Not the least evil and difficulty which sanitary officers have to encounter is the yearly change in the constitution of members forming the sanitary committee. One year there may be on the committee a leaven of gentlemen who take great interest in all sanitary matters, and who also may hold independent positions, and are above the meanness of sharing in the petty jealousies and intrigue of the class before mentioned. From these gentlemen one meets with considerate treatment and encouragement to be energetic and alive to one's duty. But the next year the committee may be very differently constituted, and may be made up of men who have no aim but the gratification of their own sense of importance, or the petty vanity of being a public man; listening to no suggestions or advice from experienced and trained officers; ready at catching up the ideas of others, and using them to show off their own cleverness. These men are great obstacles to the work of a sanitary officer, for they know little of, and care less for, sanitary laws. They come to the committee-room with personal motives, pledged to oppose the officers in every way they can, ever ready to protect themselves and their own immediate friends, owners of property, or their brother tradesmen, from the lawful sanitary improvements that may be needful—men who never can smell anything bad, cannot see anything requiring to be done, never believe anything we eat or drink is adulterated or unsound; men who, in short, use their power over the officer, and exercise a constant, meddlesome surveillance and interference *in* committee and *out* of committee, simply to gratify themselves and their friends. The result is that the sanitary state of the district suffers, the officer is tempted to become careless and indifferent, energy gives way to lethargy, and this must be detrimental to the public, and ends in all probability in increased death-rates.

The remedy for all this appears, however, to lie with ourselves. Each officer of this Association must do his best; others, who are not yet associated, should become members, and then let us combine and pull all together for the accomplishment of the end in view. The first step, in my humble opinion, is a strong and *influential* deputation to the President of the Local Government Board, asking that our appointments may be made permanent, and thus render our positions independent and free from local influences and prejudices. I say *influential*, because there are so many noble, learned, and scientific gentlemen interested in sanitary laws and science who would, I think, most readily assist us in this object if they found we were in earnest in trying to help ourselves. I feel certain that in districts where the sanitary officer is free and untrammelled, ten times the amount of sanitary work is accomplished as in districts where the reverse is the case.

In brief, every sanitary officer should, like the Government inspectors of factories, be independent and free to carry out his duties honestly, fearlessly, and conscientiously, with tact, and with credit to himself, and, what is of greater importance, the benefiting of all around him; the health, the homes, the habits, and the general improvement of the public.

PATENTS FOR SANITARY INVENTIONS.

INVENTORS and patentees of sanitary contrivances may perhaps usefully be reminded at the present time that on and after January 1 next the law governing the registration and efficacy of patents will undergo some very considerable modifications. In what follows no attempt has been made to criticise the merits or demerits of the new Patents Designs and Trade Marks Act of last session (46 and 47 Vict., cap. 57), but merely to indicate as briefly as possible what steps an inventor need take to secure patent rights in any invention or contrivance.

Application and Specification.—Any person whether a British subject or not, may make application for a patent, and two or more persons may make a joint application, and the patent may be granted to them jointly. (Section 4.) An application for a patent must be made on a form prescribed by the Act, and must contain a declaration to be made before a justice of the peace to the effect that the applicant is in possession of an invention whereof he claims to be the true and first inventor, and for which he desires a patent. The application must be accompanied by either a provisional or complete specification. A provisional specification must describe the nature of the invention, and be accompanied by drawings, if required. A complete specification, whether left on application or subsequently, must particularly describe and ascertain the nature of the invention, and in what manner it is to be performed, and must be accompanied by drawings, if required. A specification, whether provisional or complete, must commence with the title, and in the case of a complete specification

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must end with a distinct statement of the invention claimed. (Section 5.) The fee payable on application for provisional protection is 1*l.*; or if a complete specification be filed with the first application, the fee is 4*l.*

Power of Comptroller to Refuse Application or Require Amendment.—All applications will be referred by the comptroller to an examiner, who is to ascertain and report to the comptroller whether the nature of the invention has been fairly described, and the application, specification, and drawings (if any) have been prepared in the prescribed manner, and if the title sufficiently indicates the subject-matter of the invention. The comptroller may, on receipt of the examiner's report, require the application, specification, or drawings to be amended before he proceeds with the application. The applicant may appeal from his decision to the law officer—viz., the Attorney-General or Solicitor-General, who, if required, will hear the applicant and the comptroller, and may make an order determining whether, and subject to what conditions, if any, the application shall be accepted. When an application has been accepted, the comptroller is to give notice thereof to the applicant. If, after an application has been made, but before a patent has been sealed, an application is made accompanied by a specification bearing the same or a similar title, the examiner is to report whether the specification appears to him to comprise the same invention; and where he reports in the affirmative, the comptroller is to give notice to the applicants that he has so reported, and may determine, subject to an appeal to the law officer, whether the invention comprised in both applications is the same. If so, he may refuse to seal a patent on the application of the second applicant. (Section 7.)

Comparison of Provisional and Complete Specification.—If the applicant does not leave a complete specification with his application, he may leave it at any subsequent time within nine months from the date of application. The further fee payable on filing the complete specification is 3*l.* Unless a complete specification is left within the time, the application will be deemed to be abandoned. (Section 8.) Where a complete specification is left after a provisional specification, the comptroller is to refer both specifications to an examiner for the purpose of ascertaining whether the complete specification has been prepared in the prescribed manner, and whether the invention particularly described in the complete specification is substantially the same as that which is described in the provisional specification. If the conditions have not been complied with, the comptroller may refuse to accept the complete specification, unless and until it shall have been amended to his satisfaction. The applicant may, however, appeal to the law officer, and the latter must, if required, hear the applicant and the comptroller, and may make an order determining whether and subject to what conditions, if any, the complete specification shall be accepted. Unless a complete specification is accepted within twelve months from the date of application, then (save in the case of an appeal having been lodged against the refusal to accept) the application will, at the expiration of those twelve months, become void. (Section 9.)

Opposition to Grant of Patent.—On the acceptance of the complete specification, the comptroller is to advertise the acceptance; and the application and specification or specifications, with the drawings (if any) are to be open to public inspection. (Section 10.) Any person may at any time, within two months from the date of the advertisement of such acceptance, give notice of opposition to the grant of the patent, on the ground of the applicant having obtained the invention from the opponent or from a person of whom he is the legal representative; or that the invention has been patented in this country on an application of prior date; or that an examiner has reported to the comptroller that the specification appeared to him to comprise the same invention as comprised in a specification bearing the same or a similar title, and accompanying a previous application. When such notice is given the comptroller, on the expiration of the two months, is to decide on the case, after hearing the opponent and the applicant (if desirous to be heard). An appeal may, however, be made to the law officer. (Sect. 11.)

Sealing of Patent.—If there is no opposition, or in case of opposition, if the determination be in favour of the grant of a patent, the patent is to be sealed with the seal of the Patent Office. A patent is to be sealed as soon as may be, and not after the expiration of fifteen months from the date of application, except where the sealing is delayed by an appeal to the law officer, or by opposition to the grant of the patent, when the patent may be sealed at such time as the law officer may direct. If the person making the application dies before the expiration of the fifteen months, the patent may be granted to his legal representative and be sealed at any time within twelve months after the death of the applicant. (Sect. 12.) Every patent is to be dated and sealed as of the day of application, provided that no proceedings are to be taken in respect of an infringement committed before the publication of the complete specification. In case of more than one application for a patent for the same invention, the sealing of a patent on one of those applications will not prevent the sealing of a patent on an earlier application. (Sect. 13.) When an application has been accepted, the inventor has provisional protection in respect thereof. (Sect. 14.) After the acceptance of a complete specification, and until the date of sealing the patent or expiration of the time for sealing, the applicant will have the like privileges as if a patent had been sealed, but he will not be entitled to institute any proceedings for infringement unless and until the patent is granted. (Sect. 15.)

Term of Patent.—The term of every patent is limited to fourteen years from its date, but will cease if the patentee fails to make the prescribed payments at the proper times. (Sect. 17.) These fees are 50*l.* on certificate of renewal before the end of four years from the date of the patent, and 100*l.* on certificate of renewal before the end of seven years, or, in the case of patents granted after the commencement of the Act, before the end of eight years from the date of the patent. In lieu of the fees of 50*l.* and 100*l.*, annual fees may be paid of 10*l.* before the expiration respectively of the fourth, fifth, sixth, and seventh years from the date of the patent, 15*l.* before the expiration of the eighth and ninth years, and 20*l.* before the expiration of the tenth, eleventh, twelfth, and thirteenth years. (Schedule 2 of the Act.)

Amendment of Specification.—An applicant or a patentee may, from time to time, seek leave to amend his specification and drawings by way of disclaimer,

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correction, or explanation, stating the nature of such amendments and his reasons therefor. The request and the nature of the proposed amendment are to be advertised, and at any time within one month from its first advertisement any person may give notice of opposition to the amendment. When leave to amend is refused by the comptroller, the person making the request may appeal from his decision to the law officer. No amendment will be allowed that would make the specification, as amended, claim an invention substantially larger than, or substantially different from, that claimed by the specification as it stood before amendment. (Sect. 18.) Every amendment of a specification is to be duly advertised. (Sect. 21.)

Compulsory Licences.—If, on the petition of any person interested, it is proved to the Board of Trade that by reason of the default of a patentee to grant licences on reasonable terms, (*a*) the patent is not being worked in the United Kingdom, or (*b*) the reasonable requirements of the public with respect to the invention cannot be supplied, or (*c*) any person is prevented from working or using to the best advantage an invention of which he is possessed, the Board may order the patentee to grant licences on such terms as to the amount of royalties, security for payment, or otherwise, as the Board, having regard to the nature of the invention, and the circumstances of the case, may deem just, and any such order may be enforced by mandamus. (Sect. 22.)

Register of Patents.—A register of patents will be kept at the Patent Office, in which will be entered the names and addresses of grantees of patents, notifications of assignments and of transmissions of patents, of licences under patents, and of amendments, extensions, and revocations of patents, and other matters affecting the validity or proprietorship of patents, &c. Copies of deeds, licences, and any other documents affecting the proprietorship in letters patent or licences, must be supplied to the comptroller for filing in the Patent Office. (Sect. 23.)

Extension of Term of Patent.—At least six months before the expiration of a patent, the patentee may, after due advertisement, petition her Majesty in Council for its extension for a further term. Any person may enter a caveat against the extension. If the Judicial Committee of the Privy Council report that the patentee has been inadequately remunerated by his patent, it may be extended for a further term not exceeding seven, or in exceptional cases fourteen, years; or a new patent may be granted for the term therein mentioned. (Sect. 25.)

Revocation of Patent.—The proceeding by *scire facias* to repeal a patent is abolished, but revocation of a patent may be obtained on petition to the court. A petition for revocation of a patent may be presented by: (*a*) The Attorney-General in England or Ireland, or the Lord Advocate in Scotland; (*b*) any person authorised by either of them; (*c*) any person alleging that the patent was obtained in fraud of his rights, or of the rights of any person under or through whom he claims; (*d*) any person alleging that he, or any person under or through whom he claims, was the true inventor of any invention included in the claim of the patentee; (*e*) any person alleging that he, or any person under, or through whom he claims an interest in any trade, business, or manufacture, had publicly manufactured, used, or sold, within this realm before the date of the patent, anything claimed by the patentee as his invention. Where a patent has been revoked on the ground of fraud, the comptroller may grant to the true inventor a patent in lieu of and bearing the same date as the date of revocation of the patent revoked; but the patent so granted will cease on the expiration of the term for which the revoked patent was granted. (Section 26.)

Remedy in case of Groundless Threats of Legal Proceedings.—Where any person claiming to be a patentee, by circulars, advertisements, or otherwise, threatens any other person with legal proceedings or liability in respect of any alleged manufacture, use, sale, or purchase of the invention, any person aggrieved may bring an action against the patentee, may obtain an injunction against the continuance of such threats, and may recover damages if the alleged manufacture, use, sale, or purchase was not in fact an infringement of any legal rights of the person using threats. This section will not apply if the person making the threats with due diligence commences and prosecutes an action for infringement of his patent. (Section 32.)

Miscellaneous Provisions.—Every patent is to be in a prescribed form, and will be granted for one invention only, but may contain more than one claim. In an action or other proceeding, objection cannot be taken to the patent on the ground that it comprises more than one invention.* The exhibition of an invention at an industrial or international exhibition, certified as such by the Board of Trade, will not prejudice the right of the inventor or his legal personal representative to apply for and obtain provisional protection and a patent, providing that the exhibitor, before exhibiting the invention, gives the comptroller the prescribed notice of his intention to do so, and that the application for a patent is made before or within six months from the date of the opening of the exhibition. (Sect. 39.) The comptroller is to issue periodically an illustrated journal of patented inventions, as well as reports of patent cases decided by courts of law, and any other information that he may deem generally useful or important. Copies of such journal, and also of all complete specifications of patents for the time being in force, with their accompanying drawings, are to be kept on sale. (Sect. 40.) The control and management of the Patent Museum is to be transferred to the Science and Art Department. (Sect. 41.) That department may require a patentee to furnish a model of his invention on payment to him of the cost of manufacture; the amount to be settled, in case of dispute, by the Board of Trade. (Sect. 42.)

THE houses registered under the Act of Parliament for regulating common lodging-houses are inspected, at uncertain times, about twice or thrice a week, by police officers specially appointed for that purpose; but, in consequence of the numerous allusions relating to them which have recently appeared in the public prints, special inspectors have had assigned to them also the duty of visiting the common lodging-houses at varying hours, both day and night, and of reporting on the condition in which they are found. The result of the inquiries thus made is that, although these houses are the abode of the poorest class of people, their condition is satisfactory from a sanitary point of view.

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* The rule of the United States Patent Office on this subject may be usefully quoted, in case patent rights should be sought for in that country. 'Two or more independent inventions cannot be claimed in one application; but where several distinct inventions are dependent upon each other and mutually contribute to produce a single result, they may be claimed in one application.'

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THE REGISTRAR-GENERAL'S LAST QUARTERLY RETURN.

By J. HAMPDEN SHOVELLER.

THE Registrar-General's Quarterly Return of marriages, births, and deaths in England and Wales has just been issued. The statistics relating to marriages are for the second quarter of this year, ending June 30, and those for births and deaths are for the three months ending Sept. 30. The marriages showed a decline from those returned in recent corresponding quarters, and the births were fewer than those recorded in the same quarter of any year since 1877. The mortality was considerably below the average. The mean temperature during the quarter at the Royal Observatory, Greenwich, was 59°·5, and slightly below the average. The rainfall in the quarter was 6·53 inches, and was 0·12 of an inch below the average amount.

The marriages of 95,766 persons were registered in England and Wales during the second quarter of 1883, equal to an annual rate of 14·4 per 1,000 of the estimated population; this marriage-rate was lower, with the single exception of 1880, than that recorded in the same quarter of any of the ten preceding years.

During the three months ending Sept. 30 last, 214,144 births were registered in England and Wales, which were equal to an annual rate of 31·7 per 1,000 of the population in the middle of this year, estimated by the Registrar-General at twenty-six and three-quarter millions of persons; this birth-rate was lower than in any of the ten preceding corresponding quarters, and, indeed, lower than that recorded in the third quarter of any year since 1849. In the several counties the birth-rate ranged from 25·3 in Herefordshire, 27·0 in Shropshire, and 27.2 in Devonshire and in Somersetshire, to 35·3 in Nottinghamshire, 35·5 in Staffordshire, and 38·2 in Durham.

The births registered in England and Wales during the three months ending Sept. 30 exceeded the deaths by 101,026; this represents the natural increase of the population. From the Board of Trade returns it appears that 108,867 emigrants embarked during last quarter from the various ports of the United Kingdom at which emigration officers are stationed. After distributing proportionally 1,432 whose nationality was undistinguished, and excluding 17,833 foreigners, the emigrants of British origin were 90,791, including 59,034 English, 9,638 Scotch, and 22,119 Irish. The proportions of British emigrants last quarter to a million of the respective populations of the three divisions of the United Kingdom were 2,205 from England, 2,519 from Scotland, and 4,386 from Ireland. Emigration showed an increase upon that recorded in the corresponding quarter of 1882 from each of the divisions of the United Kingdom.

From returns furnished by the Local Government Board, it appears that the average number of paupers relieved on the last day of each week in the quarter ending September last was 684,523, of whom 165,263 received in-door, and 519,260 out-door relief. The proportion of pauperism to the population showed a further decline from that which

Analysis of the Vital and Mortal Statistics of the Twenty-eight Great Towns, dealt with in the Registrar-General's Weekly Returns, for the Third Quarter of 1883.

Towns.	Estimated Population middle of 1883.	Births.	Deaths.	Annual Rate per 1,000 Living. Births.	Deaths.	Principal Zymotic Diseases.	Deaths from Principal Zymotic Diseases.	Small-pox.	Measles.	Scarlet Fever.	Diphtheria.	Whooping-cough.	Fever.	Diarrhœa.	Rate per cent. of Uncertified Deaths.	Deaths of Children under one year of age to 1,000 Births.
28 Towns	8,620,975	72,123	42,677	33·6	19·9	4·1	8,817	111	1,202	1,272	325	708	688	4,510	2·4	185
27 Towns	4,665,161	39,814	24,112	34·3	20·7	4·2	4,895	88	547	726	90	367	446	2,631	3·4	191
London	3,955,814	32,309	18,565	32·8	18·8	4·0	3,922	23	655	546	236	341	242	1,879	1·0	177
Brighton	111,262	771	537	27·8	19·4	5·1	141	—	28	2	1	19	4	87	2·2	240
Portsmouth	131,478	1,125	618	34·3	18·9	3·5	114	—	2	8	4	9	29	62	0·8	180
Norwich	89,612	691	392	30·9	17·6	1·8	39	—	1	—	2	1	1	34	2·8	184
Plymouth	74,977	573	352	30·7	18·8	2·6	48	—	4	—	1	9	5	29	0·9	176
Bristol	212,779	1,628	811	30·7	15·3	1·7	92	—	13	9	6	8	7	49	3·9	131
Wolverhampton	77,557	691	359	35·8	18·6	2·0	38	1	—	3	—	—	4	30	6·7	169
Birmingham	414,846	3,456	2,115	33·4	20·5	5·2	536	54	41	127	10	24	17	263	0·7	205
Leicester	129,483	1,129	605	35·0	18·8	4·6	148	—	2	9	1	10	1	125	3·0	264
Nottingham	199,349	1,896	972	38·2	19·6	3·3	165	—	1	16	4	6	16	122	2·4	204
Derby	85,574	749	332	35·1	15·6	1·9	41	—	—	3	—	4	6	28	0·9	156
Birkenhead	88,700	769	301	34·8	16·3	2·0	44	—	5	—	—	4	9	26	4·4	150
Liverpool	566,753	4,712	3,503	35·4	24·8	5·9	839	8	171	105	7	87	128	333	4·9	226
Bolton	107,862	910	528	33·9	19·6	4·2	113	—	1	1	3	3	8	97	3·6	185
Manchester	339,252	2,954	2,107	34·9	24·9	4·8	402	—	55	65	8	39	20	215	2·9	205
Salford	230,465	1,638	1,005	34·5	21·2	5·4	258	—	48	22	5	17	19	147	3·6	201
Oldham	119,071	1,016	540	34·2	18·2	1·9	55	—	1	6	1	5	4	38	8·1	145
Blackburn	108,460	1,025	526	37·9	19·5	2·9	77	—	—	14	—	3	8	52	2·3	142
Preston	98,564	913	608	37·2	24·8	7·3	179	—	—	12	7	—	8	152	4·4	257
Huddersfield	84,701	611	403	29·0	19·1	2·4	40	—	9	1	—	6	6	24	4·0	165
Halifax	75,591	524	282	27·8	15·0	1·3	23	—	2	1	—	1	10	9	9·6	109
Bradford	204,807	1,440	835	28·2	16·4	2·2	112	—	2	13	—	14	18	65	3·1	154
Leeds	321,611	2,825	1,697	35·3	21·2	5·2	416	2	2	148	12	19	35	198	3·4	191
Sheffield	295,497	2,683	1,605	36·4	21·8	5·8	426	—	29	112	4	38	35	208	4·4	206
Hull	176,296	1,577	790	35·9	18·0	3·0	133	2	2	14	5	16	17	77	4·1	157
Sunderland*	121,117	1,288	833	42·7	27·6	3·0	91	14	1	3	3	1	14	38	3·3	153
Newcastle-on-Tyne	149,464	1,312	1,009	35·2	27·1	6·7	249	7	126	23	—	18	8	67	4·1	211
Cardiff	90,031	908	387	40·5	17·3	3·1	70	—	1	9	6	6	9	39	3·3	146

* The high death-rate in Sunderland was due to the disaster at the Victoria Hall.

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prevailed in the two preceding corresponding quarters.

During the third quarter of 1883 the deaths registered in England and Wales were 113,118, equal to an annual rate of 16·8 per 1,000 of the estimated population, which was as much as 2·1 below the average rate in the corresponding period of the ten years 1873-82; with the exceptions of 1879 and 1881, the death-rate last quarter was lower than that recorded in any quarter since civil registration commenced in 1837. Had the rate of mortality last quarter equalled the average rate in the corresponding period of the forty-five preceding years, the deaths would have exceeded by nearly 24,000 the number actually recorded. In the various counties the death-rates ranged from 13·8 in Huntingdonshire and in Wiltshire, and 13·9 in Shropshire and in Worcestershire, to 19·4 in Lancashire, 19·5 in Durham, and 20·7 in Northumberland. In the urban registration districts and sub-districts, comprising the chief towns, and containing an estimated population of fifteen and three-quarter millions of persons, the annual death-rate last quarter averaged 18·3 per 1,000; while in the remaining or rural population of about ten and a half millions of persons, the death-rate was only 14·5. These urban and rural rates were respectively 2·6 and 1·6 per 1,000 below the average rates in the ten preceding corresponding quarters.

In twenty-eight of the largest English towns, including London, and having an estimated population of more than eight and a half millions of persons, the death-rate averaged 19·9 per 1,000, and exceeded the general urban rate by 1·6. While the rate did not exceed 18·8 in London, it averaged 20·7 in the twenty-seven provincial towns, among which it ranged from 15·0 and 15·3 in Halifax and Bristol, to 27·1 in Newcastle-upon-Tyne, and 27·6 in Sunderland. The high rate in the last-mentioned town was due to the disaster at the Victoria Hall. In estimating the value of the general death-rates in the twenty-eight towns as a test of sanitary condition, it should be noted that the death-rate from the principal zymotic diseases ranged from 1·22 in Halifax to 7·29 in Preston; that the proportion of deaths of infants under one year of age to 1,000 births was only 109 in Halifax, whereas it was 264 in Leicester; that among persons aged between one and 60 years the death-rate at these ages ranged from 6·9 in Leicester to 18·9 in Sunderland, and that among persons aged upwards of sixty years the rate of mortality did not exceed 46·4 in Nottingham, whereas it was as much as 79·0 in Manchester.

The 113,118 deaths in England and Wales last quarter included 30,331 of infants under one year of age, 55,873 of children and adults aged between one and sixty years, and 26,914 of persons aged upwards of 60 years. Infant mortality, measured by the proportion of deaths under one year of age to births, was equal to 142 per 1,000, and was considerably below the average of the ten preceding corresponding quarters. In the twenty-eight great towns the proportion averaged 185 per 1,000; in London it was 177, and averaged 191 in the twenty-eight great towns, ranging from 109 and 134 in Halifax and Bristol, to 257 in Preston and 264 in Leicester. The rate of mortality in England and Wales among persons aged between one and 60 years, and also among persons aged upwards of 60 years, was last quarter below the average.

The deaths registered in England and Wales last quarter included 8,389 which were referred to diarrhœa, 2,929 to scarlet fever, 2,066 to measles, 1,706 to whooping-cough, 1,662 to fever, 888 to diphtheria, and 229 to small-pox; in all, 17,869 deaths resulted from these zymotic diseases, equal to an annual rate of 2·65 per 1,000, against an average rate of 3·78 in the corresponding quarter of the ten years 1873-82. In the twenty-eight great towns this zymotic rate averaged 4·10 per 1,000 last quarter, and ranged from 1·22 in Halifax and 1·74 in Bristol, to 6·69 and 7·29 in Newcastle-upon-Tyne and Preston. In fifty other large towns this zymotic rate averaged 2·68, and in the remaining or rural portion of the country it was 1·84 per 1,000.

As is usual in the third quarter of the year, diarrhœa was by far the most fatal zymotic disease in England and Wales during the three months under notice. The 8,389 deaths referred to this disease were equal to an annual rate of 1·25 per 1,000, which was as much as 0·76 below the average rate in the ten preceding corresponding quarters. In the twenty-eight towns the death-rate from diarrhœa averaged 2·10 per 1,000, and in the several towns the rates of mortality from this disease showed the usual wide divergence; for whereas it did not exceed 1·22 in Halifax, and 1·74 in Bristol, it ranged upwards in the other towns to 5·94 in Liverpool, 6·69 in Newcastle-upon-Tyne, and 7·29 in Preston. In the fifty other towns the rate averaged 2·68, while in the rest of England and Wales, after excluding these seventy-eight towns, it was 1·84 per 1,000. The 2,929 fatal cases of scarlet fever were equal to an annual rate of 0·43 per 1,000, which was a lower rate than has been recorded in any of the ten preceding September quarters. In the twenty-eight great towns the highest scarlet-fever rates were 1·23 in Birmingham, 1·52 in Sheffield, and 1·85 in Leeds. Among the fifty other considerable towns, however, the rate was equal to 3·47 in Dudley, 3·69 in Ashton-under-Lyne, and 3·95 in Rotherham. The mortality from measles exceeded the average; the annual death-rate from this disease was equal to 0·26 per 1,000 last quarter, against an average rate of 0·26 in the ten preceding corresponding quarters, and was excessive in Brighton, Salford, Liverpool, Newcastle-upon-Tyne, Merthyr Tydfil, and Darlington. The 1,706 deaths from whooping-cough were equal to an annual rate of 0·25 per 1,000, and were considerably below the average; among the twenty-eight towns the highest death-rates from this disease were recorded in Sheffield, Liverpool, and Brighton. The rate of mortality from fever, principally enteric, was equal to 0·25 per 1,000, and was lower than that returned in any of the ten preceding September quarters, in which it averaged 0·38. In the twenty-eight great towns the fever death-rate averaged 0·33, but was 0·89 in Portsmouth, and 0·91 in Liverpool. Among the fifty other towns the highest fever death-rates were 0·73 in Ystradyfodwg, and 0·84 in Middlesbrough. The 888 fatal cases of diphtheria exceeded the average; the highest death-rates from this disease were returned in London, Cardiff, and Preston. Of the 229 deaths from small-pox recorded in England and Wales during last quarter, 54 occurred in Birmingham, 23 in London, 14 in Sunderland, 8 in Liverpool, 7 in Newcastle-upon-Tyne, 15 in West Bromwich, and 10 in Gateshead.

The causes of 102,397, or 90·6 per cent. of the total deaths in England and Wales last quarter were certified by registered medical practitioners, and 6,593, or 5·8 per cent. by coroners. The remaining

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4,128, or 3·6 per cent. were uncertified; this proportion showed a further decline from those prevailing in recent quarters. In London the proportion of uncertified deaths was only 1·0 per cent., whereas it averaged 4·2 per cent. in the rest of England and Wales. In the twenty-eight towns the proportion of uncertified deaths averaged 2·4 per cent., and ranged from 0·7 and 0·8 in Birmingham and Portsmouth, to 6·7 in Wolverhampton, 8·1 in Oldham, and 9·6 in Halifax.

ON COPPER IN FOOD.

By C. T. KINGZETT, F.I.C., F.C.S.

A PERUSAL of the article 'On Copper and Lead in Food,' which appeared in the last issue of the SANITARY RECORD, has induced me to communicate the following notes.

The ill-founded apprehensions of danger to the public health by the presence of minute quantities of copper in articles of food were investigated in a practical manner by Dr. B. H. Paul and myself in 1877, and the results of our investigation were communicated to the Pharmaceutical Conference in September of that year. (See *Pharmaceutical Journal*, Sept. 22, 1877.) We proved that the copper which we found present in preserved peas, and which was equal to about one grain of sulphate of copper to the tin containing 9½ to 9¾ ozs. contents, was there in a state of chemical combination, and could be entirely dissolved out of that state by a process of artificial digestion conducted in the laboratory. We then took repeated doses of sulphate of copper over a period of seven days, each daily dose consisting of three-tenths of a grain of the compound, and proved by carefully conducted experiments, that a large proportion of this copper was eliminated in the fæces, a result which corresponds to what is well known of the action of ferric preparations when taken into the system. If now, we argued, a large proportion of a dose of a soluble salt of copper is eliminated from the system, how much larger must be the proportion in the case of an insoluble compound of copper such as that which exists in preserved peas! It is to be remarked that in our earlier experiments with artificial digestion we had found that the process had to be greatly protracted to insure the solution of all the copper, so that in all probability the greater part of the copper present in preserved peas would pass unchanged, and therefore unabsorbed, through the intestinal canal. Thus, we did not hesitate to express a well-founded opinion that the minute amount of that metal present in such articles of food as preserved peas could not prejudicially influence health. Our paper led to an interesting discussion and a good deal of confirmative evidence. Thus Dr. Rowe mentioned the fact that a stream in the county of Cornwall which had supplied drinking water to the inhabitants in the neighbourhood contained sufficient copper to be profitably precipitated by iron, and yet had been freely consumed without inconvenience or danger. The well-known experiments of M. Galippe, then recently communicated to the French Academy of Sciences, were confirmed by and confirmative of our own results. Thus it will be seen M. Gautier's opinion, much more lately expressed, is by no means of a novel character.

I may add that some time ago a singular confirmation of the results of the investigation conducted by Dr. Paul and myself was forthcoming at the hands of Dr. Michele Giunti, of Portici, who contributed an important paper to the *Gazetta Chimica Italiana* (see the abstract in *Jour. Chem. Soc.*, 1880, p. 275). He discovered copper to be present in some bats' guano obtained from a cave at Santagata d' Esaro to the extent of 0·348 to 0·403 per cent. of cupric oxide (CuO), and upon examination of the bats, whose excrements had formed the guano, he found the incinerated residue furnished an amount equal to 0·0014 on the original weight of the animals. It is worthy of note, Dr. Giunti adds, that the proportion of copper found in the animals being much less than that in the guano, confirmation is lent to the observations of Paul and Kingzett that when copper is administered internally, the greater portion passes out with the excrements.

Dr. Giunti examined more than twenty species of insects for copper, which was always found present, as it was also in the hedgehog and a species of lizard. He accounts for the very large quantity found in the *Blatta orientalis* (0·826 per cent. CuO on the ash) by the fact that they come into intimate contact with copper vessels in their excursions about the house in search of food. In the paper to which I have previously referred, Dr. Paul and I stated, 'We think it probable that quite as much copper finds its way into the system through the handling of copper coins, the use of copper vessels in cooking operations, and in the consumption of pickles and such articles which are often prepared in copper vessels. At least we believe preserved peas are absolutely innocuous to health.'

THE HOUSING OF THE POOR.—The Earl of Mount Edgcumbe has been making diligent inquiries into the condition of the dwellings of the poor in Stonehouse, and finding that there is great room for improvement, has initiated the work by promising to give a site for a block of workmen's dwellings, and 1,000*l.* towards their erection. Dr. Hingston has promised another 1,000*l.*, Mr. Bulteel 500*l.*, and Mr. Pethick 250*l.*, and thus practically the funds necessary to complete a block of workmen's dwellings larger than any of those in Plymouth, are forthcoming. Mr. Snell will immediately prepare plans, and the erection will be commenced without delay. Perhaps this admirable example will stimulate others to do equally good and practical work in the same direction.

MR. G. E. ELLISON, ventilating engineer, Leeds, has just issued a mounted sheet of designs, showing how easily the Stevens' exhaust ventilators can be constructed in an ornamental form. These ventilators have no movable parts, and, whilst using the wind power to the fullest extent, they offer the least resistance to the warm air passing out in calm weather. It is claimed that the price of these cowls is only one-half that of some other makers in the market.

THE syndicate appointed to superintend the Cambridge examinations in State Medicine have issued their ninth annual report, in which they state that sixteen candidates presented themselves at the examination held in October last in Part I., and seventeen candidates in Part II. Sixteen who passed in both parts received certificates of proficiency in Sanitary Science. The corresponding numbers in 1882 were fifteen candidates in Part I., fourteen candidates in Part II., and eleven passed both parts and received certificates. The number of candidates who have failed to satisfy the examiners is, proportionately to the number examined, less than at previous examinations.

THE vestry of the parish of St. Matthew, Bethnal Green, have served the owners of at least 380 dilapidated houses with notices requiring them to put the tenements in a habitable state of repair.

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THE
SANITARY RECORD.
DECEMBER 15, 1883.

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The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

LEGISLATION FOR HABITUAL DRUNKARDS.

THE recent opening of the Dalrymple Home for Inebriates at Rickmansworth again directs attention in a pointed manner to the Habitual Drunkards Act of 1879, under which this home has been established. The home is conducted by a committee, elected by an influential philanthropic association, under the presidency of Lord Shaftesbury, in such a manner that no member of the committee or of the association derives any pecuniary benefit from the undertaking. The home, which will accommodate sixteen patients, is, moreover, a charming country residence, replete with every comfort, and the terms under which the patients are received are very moderate, so that the establishment appears altogether to be started with every probability of success in its favour. It is, at any rate, allowable to hope that the reclamations effected within its walls may be both many and permanent.

As regards the legislation under which persons of inebriate habits may be received into the home there appears to be considerable ignorance, which extends even to the minds of medical practitioners, upon whom probably will chiefly fall the responsibility of recommending patients to seek for admission. It seems, therefore, that a short review of the Habitual Drunkards Act of 1879 may, at the present season, prove advantageous. The Act was chiefly promoted by the late Mr. Donald Dalrymple, M.P., Dr. Cameron, M.P., and the Earl of Shaftesbury, and is entitled, 'An Act to facilitate the control and cure of Habitual Drunkards.' It applies to all three divisions of the United Kingdom. It came into force on the first day of January, 1880, and is to remain in operation for ten years. An 'habitual drunkard' is defined to be 'a person who, not being amenable to any jurisdiction in lunacy, is, notwithstanding, by reason of habitual intemperate drinking of intoxicating liquor, at times dangerous to himself or herself or to others, or incapable of managing himself or herself, and his or her affairs.'

The homes, called 'retreats' in the Act, must be licensed by the local magistrates, and the licence may be granted to any person or to two or more persons jointly for any period not exceeding thirteen months, when it is renewable. One at least of the persons to whom the licence is granted shall reside in the retreat, and be responsible for its management. A duly-qualified medical man shall be employed as medical attendant of the retreat, but the licensee, if his name be on the medical register, may himself act as such medical attendant. No licence shall be given to any person who is licensed to keep a house for the reception of lunatics. The licence may be transferred by the magistrates from one person to another; whilst, if the retreat becomes unfit for habitation, the discharge of the persons detained therein shall be ordered by the inspector of retreats or the magistrates. Any habitual drunkard desirous of being admitted into a retreat may make application to the licensee of a retreat, stating the time during which he or she undertakes to remain in the retreat. The application must be according to a special prescribed form, and must be accompanied by the statutory declaration of two persons, to the effect that the applicant is an habitual drunkard. The signature of the applicant must be attested by two justices of the peace, who must have satisfied themselves that he is an habitual drunkard, and must have explained to him the effect of his application. Once admitted, he shall not be entitled to leave the retreat until the expiration of the term mentioned in his application, which shall not exceed the period of twelve calendar months. Notice of the reception of a patient has to be sent at once to the magistrates and to the Secretary of State. The patient may be discharged at any time by a magistrate upon the request of the licensee of the retreat, if the request shall appear reasonable and proper.

The Secretary of State may appoint an inspector and assistant inspector of retreats, whose duties shall be such as the Secretary of State may prescribe, and whose salaries shall be fixed by the Treasury, and paid by Government. Every licence, and every renewal of a licence, shall be impressed with a stamp of five pounds, and ten shillings for every patient above ten whom it is intended to admit into the retreat, which shall be paid by the licensee. Every retreat shall be inspected at the least twice a year, and the discharge of any person detained therein may be ordered by the Secretary of State. The inspector shall in the month of January in each year present an annual report, giving full particulars of each retreat, and of the patients admitted during the past year, which shall be laid before Parliament. The Secretary of State may make, cancel, or alter rules for the management of retreats. Any judge of the High Court of Justice, or a County Court judge within whose district the retreat is situated, may authorise any person to visit and examine any person detained in a retreat, and to report thereon; and the judge, on receiving the report, may, if he think fit, order the discharge of such person from the retreat. At the request of the licensee of a retreat a magistrate may permit an habitual drunkard who has been already admitted to the retreat to live out of it with a trustworthy person until the original period of detention shall have expired. If the habitual drunkard, thus semi-liberated, escapes or refuses to be restrained from drinking intoxicating liquors he shall forfeit his leave of absence, and may be taken back to the retreat. The magistrate or Secretary of State may also revoke the leave of absence.

It is an offence against the Act if the licensee of a retreat wilfully fails to comply with its provisions, or neglects the patients placed in the retreat; or if any person employed therein wilfully neglects any of the patients, or assists in their escape therefrom, or, without the authority of the licensee or medical officer of the retreat, supplies any patient with any intoxicating liquor, or sedative narcotic, or stimulant drug or preparation. If a patient wilfully refuses to conform to the rules of the retreat he is

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liable, upon summary conviction, to a penalty not exceeding five pounds, or to imprisonment for a period not exceeding a week; and at the end of such time he shall be restored to the retreat for curative treatment until the expiration of the originally prescribed period of detention. If a patient escapes, a magistrate may issue a warrant for his apprehension, and remit him to the retreat. In the case of death of a patient the medical attendant shall, under penalty for omission, send an attested statement of the cause of death to the coroner, to the registrar of deaths, and to the clerk to the magistrates. The penalty for all offences against the Act committed by any person, not being a patient detained in a retreat, is a sum not exceeding twenty pounds or imprisonment for a term not exceeding three months with or without hard labour. Any person convicted has liberty to appeal to a higher court.

It will thus be seen that the Act is a substantial instalment of legislation for inebriates; affirming, as it does, the principle that retreats for habitual drunkards might be opened. Nevertheless amendments in the Act seem now to be called for, as was explained in a paper read by Dr. Norman Kerr at the meeting of the Social Science Congress at Huddersfield in October last. He showed therein that the temporary nature of the Act, which will expire in 1889, has been largely responsible for the hitherto almost entire non-use of it that has been made. The short period during which the Act is to be in operation has naturally prevented any large outlay on retreats, only two of which were open in January last.

The first improvement, therefore, sought for in the Act is that it shall be made a permanent instead of a temporary measure. The presence of two magistrates, who must together examine the patient, is another hindrance to the full usefulness of the Act, particularly when the patient is a woman. One magistrate alone could do all that is required in this respect, and it is suggested that the patient's own written confession, backed by medical or other certificates, should be sufficient to procure admission to the retreat. It should further be possible, as it is in the State of New York, for the nearest relatives or friends of an habitual drunkard to apply to a magistrate, backed with a medical certificate, and to obtain from him an order for the compulsory detention of the patient in a licensed retreat. For, as Dr. Kerr pertinently remarked, 'besides the terrible injury he inflicts on his household, the habitual drunkard works much mischief to the community in which he lives. He is not a friend but a foe to the public good. He is a disturber of the peace, a promoter of riot, and the occasion of a large proportion of the criminal and reformatory expenditure of the country. He is also a standing menace to the security of life.' The power to detain all classes of inebriates should also be extended, so as to permit Boards of Guardians to detain habitual drunkards, who are paupers, for a definite period in homes, which might be made industrial reformatories, and possibly might become almost self-supporting.

Such amendments as these seem certainly to be called for, and with their enactment the Act might be expected to become extremely useful to the State, to the distressed friends and relatives of inebriates, and to these unfortunate people themselves, who, being detained for a time in retreats under its beneficial provisions, would in many instances obtain therefrom such a permanent improvement in bodily health and mental strength as would enable them to return afterwards to their ordinary spheres of usefulness in life.

NOTES OF THE MONTH.

WARRANTY AS TO QUALITY OF MILK

A CASE of some importance as to the construction to be placed on section 25 of the Food and Drugs Act, 1875, was recently heard at Bristol. A dairyman was summoned for selling milk adulterated with 10 per cent. of water. The adulteration was not denied, but it was urged that the milk was sold in precisely the same condition as it was received, and that the agreement between the dealer and retailer was really a warranty within the meaning of section 25. The bench reserved their decision, but ultimately refused to accept the contract as a warranty, being of opinion that from section 27 it must be intended not to apply to future supplies of goods, but to a specific document containing words implying warranty given with the articles sold, and not to a running contract. The bench supported their opinion by referring to the decision of Baron Pollock in the case of Rook *v.* Hopley (38 L. J., N.S., 649), in which it was held that 'what is required by the statute is a writing expressing on the face of it that it is a warranty.' In the case of Rook *v.* Hopley, referred to above, a retailer was proceeded against for selling lard adulterated with 15 per cent. of water, and his defence was that he had at the time of purchase obtained a warranty from the dealer. This document set out that four tins of lard, No. 1, of 28 pounds each, had been purchased. It has been previously held, in the case of Josling *v.* Kingsford, that words of description do not constitute a warranty, though adulteration would afford a proof of repudiating the contract; and Baron Pollock held that the document was a mere bought note, and not an express written warranty. The question raised at Bristol is one of general interest, since not long ago a large dairy company escaped conviction on a similar plea.

THE SMOKE NUISANCE IN MANUFACTURING TOWNS.

NOT long ago (SANITARY RECORD, vol. xiv., p. 408) we drew attention to the prevalence of smoke nuisances at Salford, to their pernicious influence upon the health of the people, and to the measures which were being adopted by the local authority towards minimising the evil. Dr. Tatham refers again to the subject in his last report, and states that while at the close of 1881 there were 316 boilers and furnaces properly constructed and 301 improperly constructed, the figures for 1882 are 378 and 250 respectively, while a number of old and imperfectly constructed boilers had been replaced by new and improved ones. During the year under report 149 notices had been served upon owners to properly construct their furnaces, but more than 50 per cent. were apparently unheeded, since in 70 cases only were the notices complied with. Legal proceedings were taken in but sixteen cases, nine of which were against persons for negligently using furnaces constructed to consume their own smoke, six for using furnaces not so constructed, and one for permitting a smoke nuisance. So far as th

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inspector is concerned, there seems to have been no lack of attention or zeal, but it is evident that the question has not been so thoroughly or systematically dealt with as it should be. The area of the borough, which extends over eight square miles, is, as Dr. Tatham points out, so large that, in order to keep this nuisance within reasonable check, the authority will find it necessary to commit the supervision of the chimneys to an inspector whose undivided attention shall be directed to this duty. Surely this is but little to ask, when the health and comfort of 184,000 persons are considered. A somewhat similar state of things exists at Preston, where it is not unreasonable to suppose that some share of the high death-rate from diseases of the respiratory organs is due to the impurities which are constantly being discharged into the air. Mr. Pilkington, the health officer, advises careful stoking, but he thinks that combined action on the part of sanitary authorities in large manufacturing towns, and a uniform scale upon which to base prosecutions, would be a great step towards remedying the evil.

MORTALITY IN PRISONS.

THE recently published report of the Prison Commissioners for the year ended March 31 last, shows that the total number of deaths from natural causes amongst prisoners of both sexes in the local prisons of England and Wales during 1882–83, was 141, representing a death-rate of 7·8 per 1,000 of the daily average population. This rate was 0·4 below that recorded in 1882, and was 2·2 less than that of the previous ten and a half years. Pulmonary phthisis was fatal in 18 cases, but in 12 of these the disease was known to have originated before reception into prison. Moreover, all but one of 15 deaths recorded from heart-disease were of prisoners suffering at the time of their incarceration. Indeed, out of the whole mortality the disease which was the cause of death originated before imprisonment in 70 cases. The releases on medical grounds were 127 in 1882–83, as against 118 in the previous year; and were it not that a large proportion of the prisoners are received in a diseased condition, the general death-rate, and the rate of release on medical grounds, would be much lower than they are. Enteric fever was fatal in one case only, and to this fact prominent attention is called in the report as indicating the high sanitary condition of the prisons. It is to be noted that the numbers of suicides (ten) was less than that of any year on record, either before or since the prisons came under the administration of the Commissioners. Reference is made in the report to the recommendation passed by the prison conference last year, 'that prisoners sentenced for three or four months should, for the last three weeks of imprisonment, have an improved dietary,' and to the opinion of the committee which was appointed to consider the question as to the sufficiency or otherwise of the diet. The committee were unable to discover any instances in proof of the statement that prisoners undergoing these sentences were sometimes 'so weakened by the diet as to be unfit for hard labour on discharge,' while evidence to the contrary was abundant. It is clear that the committee are of opinion that the diet now in use is amply sufficient, and they conclude their report by making a recommendation which they believe will 'meet the views of the conference without bringing about the evils which would ensue from such interference as would affect the whole scheme of diet.' The recommendation is that medical officers may be desired carefully to examine every prisoner undergoing a sentence of three to four months' imprisonment, twenty-one days before discharge, with the object of ordering an increase of diet, if such increase should in any case be deemed to be necessary. Steps have lately been taken to carry this recommendation into effect.

RECREATION FOR THE PEOPLE.

THERE is a notion abroad that the whole duty of local authorities is comprised in the laying down of drain-pipes and the supply of dust-carts. Professed economists scout as extravagant any efforts towards making the lives of the poor brighter and happier by the foundation of free libraries or the provision of means of recreation. A novel and interesting experiment has recently been tried at Birkenhead in the establishment of a public bowling and quoiting ground in the park. The ground was opened in May, and was well attended all through the summer and autumn. No charge is made for admittance to the ground, but a small fee is charged for the use of the bowls or quoits. The receipts show that 3,226 players had used the bowls and 4,004 the quoits; and there is thus excellent evidence that the Health Committee's efforts to provide the means of healthy open-air recreation have been successful. Probably a very large proportion of the men thus exercising their muscles and improving their physique would, but for the Committee's action, have been wasting their time and their money in the public-house.

DIMINUTION OF DISEASE BY COMPULSORY NOTIFICATION.

SOME few months ago a controversy that threatened at one time to cause unpleasant complications arose between the health officers of certain towns where compulsory notification is in force, and those who argue that notification is of no practical avail in the diminution of infectious disease. It is perhaps natural for health officers to look with favour on a plan which facilitates and expedites their work in so many important ways, whilst the repugnance of the medical practitioner to constitute himself the agent for the notification has probably induced many to magnify the mishaps which now and again happen, and to accept too readily the somewhat broad assertion that notification does no good. As a contribution to the question the figures given in Mr. Vacher's recent report on Birkenhead deserve notice. Mr. Vacher is one of the best-known and most-trusted of our urban medical officers of health. Mainly through his work, Birkenhead has become noted for the energy and completeness of its sanitary administration. And this is what Mr. Vacher says: 'The allegation that compulsory notification in places where it exists has increased the mortality from diseases required to be notified is certainly not supported by facts in Birkenhead thus far.' 'The mortality from the diseases required to be notified, during the first quarters of the four years 1878–81, averaged 38¾; the mortality from the same during the second quarters of these four years averaged 35; during the third quarter it averaged 23¾; and during the fourth quarter it averaged 48¼. Compulsory notification became the rule at the end of 1881,

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and the corresponding mortality during the four quarters of 1882 was respectively 18, 17, 23, and 43. In brief, the deaths from diseases required to be notified were 101 in 1882; in the four years immediately preceding they averaged upwards of 145. The general mortality was not exceptionally low in 1882—the death-rate was 20·11; in the four preceding years it averaged 19·84. The mortality from zymotic diseases not required to be notified was not exceptionally low in 1882—the death-rate from whooping-cough was 1·02, from diarrhœa ·72, and from other zymotics ·77; in the four preceding years the mean death-rates from each of these were ·67, ·67, and ·70 respectively. Is it possible, Mr. Vacher asks, to resist the conclusion that compulsory notification was to some extent instrumental in lowering the mortality from the diseases required to be notified?

BUTCHER SHOPS AND SLAUGHTER-HOUSES.

MR. HARRIS, in his last report on the health of Sunderland, draws prominent attention to the importance of the town being provided with a public abattoir. At present many of the butchers kill their cattle and sheep in the shops, having their lairs on the premises, and in consequence it is no uncommon occurrence to find groups of children, and sometimes grown-up persons, collected about a shop witnessing the felling of a beast or the sticking of a sheep. Apart from the moral view of the question, Mr. Harris points out that this public method of slaughtering cattle is likely to cause a severe shock to persons who are of a nervous temperament, and he instances two cases in which ladies were attacked with hysterics through seeing beasts felled as they passed an open shop. Unfortunately for the inhabitants, there is no clause in the by-laws which govern these shops to compel the butchers to close their premises while slaughtering is going on. The benefits to be derived from the provision of an abattoir, especially in a town circumstanced like Sunderland, are obvious, and we are glad to find that the Health Committee seem alive to the importance of the question, since they intend seeking powers in a local Act of Parliament for the erection of a public slaughter-house. This step will be a distinct advance on the grounds of public health and decency. From a pecuniary point of view, moreover, little need be feared, for with efficient management there seems no reason why the establishment should not be made quite self-supporting.

PREVALENCE OF TUBERCULAR DISEASE.

IN a recent report by Dr. Johnston on the sanitary condition of Leicester, is an interesting account of an examination into the causes of an alleged excessive prevalence in that town of diseases of the tubercular class. During the four years 1878-81 there were 841 deaths recorded from these causes. Inquiry as to the heredity of the disease showed that in 206, or 51 per cent., of the cases there was an undoubted history that the family were consumptive. In many of the remaining 197 cases there was an evident dislike among the people to furnish the real cause of death of their relatives, but no doubt was left in Dr. Johnston's mind that a history of consumption was connected with many of their families. Damp houses seem to have exercised but little effect in the causation of the disease, since those parts of the borough which suffer most in times of flood were least affected during the four years under notice. In regard to the influence of occupations, out of 316 of the male deaths, the highest mortality occurred amongst those employed in the shoe trade. Sixty were engaged in working trades, 46 were labourers, &c., 34 were warehouse hands, 28 were tradesmen, and 20 were mechanics. Of 51 females, 18 were warehouse and 7 factory hands, 14 lived at home, and the heading 'various' accounts for the remaining 12. Judged by these figures the death-rate of Leicester from tubercular affections does not seem to be more serious than that of many other manufacturing towns.

MORTUARIES FOR THE METROPOLIS.

WHATEVER differences of opinion may exist as to the most promising remedy for the overcrowding of the poor, now attracting so much public attention, there can be none as to the urgent and pressing need of increased mortuary accommodation. That a dead body should have to remain day after day in the same room as the living, for lack of a proper receptacle for it pending burial, is, as Mr. Edwin Chadwick has recently again pointed out in a letter to the *Times*, a disgrace to our civilisation. An inquiry made some time ago revealed the startling fact that in the great majority of metropolitan sanitary districts there was no mortuary accommodation at all, and where it does exist it is commonly administered on the narrowest parochial principles. Thus, at the conclusion of an inquest held a short time ago on the body of a lad who had lost his life by the overbalancing of a boat, the coroner's officer stated that having found the body in the parish of Aldgate, where the mortuary has been demolished by the Metropolitan Board of Works, he carried it to the adjoining parish of Wapping. Here he experienced great difficulty in placing it; and the mortuary keeper told him that he would not in future receive any bodies from without his parish. In answer to the officer's application to know how to proceed in future cases, the coroner stated that what he had just heard was a great public scandal, which ought not to be allowed to exist. It was the duty of the parish officers to provide a resting place for the bodies of those found dead, and he directed his officer, should such a case arise again, to take the body to the house of one of the churchwardens, and, failing that, to the police station. Could any plea much stronger than this be wanted as to the necessity of a reform in our London municipal arrangements?

PLUMBING.

AT a recent meeting of the National Health Society a communication was received from Mr. George Shaw, master of the Plumbers' Company, in response to a communication which had been addressed to him from the society, expressing the desire to co-operate with the Guild of Plumbers in promoting the systematic instruction, examination, and registration of plumbers. The master of the Plumbers' Company intimates that the attention of the Guild is directed to this subject, and that methods of forwarding the desired object were under consideration, in which they would be glad of the co-operation of the National Health Society. In the previous year, the National Health Society had instituted a series of lectures to plumbers which were attended by

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audiences so large that the course had to be repeated and a subsequent examination was held which included the testing of practical work done by plumbers. It was conducted by Mr. George Shaw and Mr. Ernest Turner; the result showed that, while, on the one hand, plumbers were evidently very desirous of better instruction; on the other hand, their work was, in a great majority of instances, so defective, even among the picked men who appeared for examination, that only a small proportion of the prizes could be awarded, and very little of the work was of first-rate quality. Mr. Ernest Hart, the Chairman of the National Health Society, read a detailed paper at the meeting of the British Medical Association at Liverpool on this subject, including a draft for proposed legislation, and will, in the course of the season, make a communication at the British Institute of Architects with the view of securing the co-operation of that society in this much needed measure of sanitary reform.

THE LONDON WATER QUESTION.

At a meeting of the Paddington Vestry the following resolution was passed unanimously :—'That this Vestry heartily congratulates Mr. Archibald E. Dobbs and Mr. Frank Dethridge on the unanimous judgment that has been given by the House of Lords in the action against the Grand Junction Waterworks Company, and this Board hereby records its appreciation of the public spirit and energy displayed by Mr. Dobbs and Mr. Dethridge in taking up a matter so deeply affecting the interests of the ratepayers of the metropolis, and of Paddington in particular, and desires to thank them for having done so.'

Mr. Mark H. Judge suggested that a special committee should be appointed to make some more public acknowledgment of the services rendered to the ratepayers by Mr. Dobbs and Mr. Dethridge, and ultimately the following resolution was agreed to, viz. :—'That a committee be appointed to consider how best the ratepayers of the metropolis can mark their deep sense of the gratitude due to Mr. Archibald Dobbs and Mr. Frank Dethridge for their action against the Grand Junction Waterworks Company, and that the other Vestries and Local Boards of London be invited to co-operate with this Vestry in the matter.'

SEWERS AND HOUSE DRAINS.

Professor F. de Chaumont, F.R.S., presided at the usual weekly meeting of the Parkes Museum on Thursday, November 29, when Dr. Charles Kelly, of King's College, delivered an address on 'Diseases caused by Sanitary Defects.' After giving a series of proofs of disease resulting from sanitary defects, Dr. Kelly referred to the present system of ventilating the sewers and the house drains separately, and urged that it would be better to abolish the traps and air-chambers now used to disconnect the house drains from the public sewer. He advocated the direct connection of the house drain with the sewer in every case, so that the ventilating pipe to each house might serve as a ventilator to the public sewer. In the discussion which followed, Mr. Mark H. Judge, A.R.I.B.A., said that he saw great danger in the suggestion that private house-drains and soil-pipes should be used as ventilators for the public sewers. The public sewers should be thoroughly ventilated by the public authorities, and the ventilators as well as the sewers should always be under public control, which could never be the case where Dr. Kelly's suggestion might be adopted. Mr. Judge contended that every house should be disconnected from the public sewer, and that then the owner or occupier should be held responsible for the ventilation of his own drains and the sanitary condition of his dwelling. Dr. Poore, in proposing a vote of thanks to the lecturer, referred to the open sewers which run through acres of market gardens in the vicinity of the metropolis, carrying into the Thames what ought to be given to the land. There was a moral responsibility in this matter which was overlooked, and he thought that in country districts instead of combined systems of drainage being adopted, the refuse of each house should be deposited on the land connected with it. Mr. Rogers Field, M.I.C.E., seconded the vote of thanks, and in the course of his remarks said that the question of moral responsibility was one which educated men did not yet recognise in connection with drainage. He knew of cases where educated and wealthy people were even now putting in cesspools, thus contaminating the water supply of their own or other districts.

CHICAGO CANNED BEEF.

The consumption of Chicago beef is very large in America, but for many years Chicago canned beef has been the subject of a well-founded distrust on the part of consumers. This suspicion and distrust arose from the fact that animals known to be suffering with disease, such as hog cholera, cancer and splenic fever in cows, and foot-rot in sheep, were shipped to the stock-yards in this city, and slaughtered either by unscrupulous local dealers or by packers. There was great profit in the practice. This rascally trade is we are glad to learn to be broken up. For some time the health department have had one inspector located at the stock-yards. Since September 1 he has condemned and sent to rendering establishments eighty-five head of cattle. At the present time two inspectors are located there, and their inspection is severe. This inspection will undoubtedly be maintained, and there need, it is affirmed, be no further fear of the quality of meat offered for sale in Chicago.

In connection with the above, it is worthy of notice that the Commissioner of Agriculture, Mr. George B. Loring, has issued a circular, in which he has called, at Chicago, on November 15 and 16, a conference of representatives of all bodies interested in the animal industries of the United States. At this convention it is proposed to discuss the subject of contagious diseases among domestic animals, under the following heads :—(1) The extent to which they prevail in the United States; (2) the methods of their introduction and spread; (3) the methods by which they may be eradicated or isolated; (4) the efficiency of existing legislation.

WORKMEN'S DWELLINGS AT MULHAUSEN.

Some interesting information as to the work done by the association for providing workmen in Mulhausen with commodious houses was given at the recent annual meeting by the President, M. Jean Dolfus, the well-known manufacturer. From the report which he read, it appears that at the time of the annual meeting of shareholders last year, the number of houses built was 1,016, all of which, with the exception of six, had been sold. Twelve more

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have been built since, and all of these have since been sold; while in the course of the next twelve months as many more will be built. When the report speaks of the houses being sold, it will, of course, be understood that the purchasers are paying for them by instalments, but the workmen are not often in default, for 731 of the 1,028 are already paid for in full, and in only eleven cases has the association been obliged to take back a house, while only fifty-three of the purchasers are in arrear, and that for sums ranging from 8*l.* to 24*l.* The average cost of each house is about 160*l.* The association also owns several furnished rooms, which are let at 5*s.* a month to single men, and these are always full, while the baths and wash-houses which they have built for the use of the occupiers of their '*cité ouvrière*,' as it is called, are much appreciated.

THE EXCESSIVE DEATH-RATE OF NEWCASTLE.

THE continued high death-rate of Newcastle is naturally exciting considerable interest and anxiety amongst the inhabitants; it is satisfactory to learn that the anthorities are actively bestirring themselves to find out the cause of the excessive mortality with the view of providing some efficient remedy. A special meeting of the City council was held on the 6th inst., to consider this important question, when the sanitary committee presented an elaborate report relative to the proceedings they had already carried out, and others which were in contemplation, in order that the inquiry into the matter should be most searching and complete. A house-to-house visitation has been organised, by which a report will be obtained as to the condition of house drains, ash-pits, water-closets, the density of the population, and all other matters affecting the public health. The Medical Officer of Health is also preparing an exhaustive report on the subject, which is looked forward to with much interest. The city engineer has been requested to report as to the condition of the sewers of the city, and that official has already sent in his report of the state of the sewers in the Byker district, and which accounts for much of the disease so prevalent in that locality. The city engineer (Mr. George Laws) states that, notwithstanding the physical advantages which the district offers for obtaining a capital fall, he found one of the main sewers (a 12-inch pipe) completely stopped up by the accumulation of various articles which mischievous juveniles had probably put down the ventilating manhole grates. A frequent cause of stoppage was the imperfect manner in which house drains were connected with the main sewer. In many cases the use of proper eyes on junctions were discarded, and a connection effected by making a hole in the main sewer with a pick, into which was inserted to some distance the jagged end of the house drain, offering every facility for continuous obstruction. In almost every case the house drains were laid shallow and joined the street sewer (if joined at all) by a sudden dip, well calculated to cause stoppage. In most cases the stoppage was found at those imperfect junctions with the main drain, otherwise the capacity of the sewers was sufficient for the requirements of the neighbourhood. Mr. Laws has recommended, and the sanitary committee sanctioned, the use of dirt trays under the street manholes, which will prevent the accumulation of sticks and other rubbish to which the sewers have been subjected. Experience has shown that these dirt trays do not interfere with the ventilation, and can be easily cleaned out as occasion requires. Mr. Laws also suggests the propriety of forming a new main drain to serve a portion of the district, instead of that unsatisfactory system of patching and tinkering which has previously been the rule; he also has made other practical suggestions to the sanitary committee on various matters pertaining to the preservation of the public health, which will probably be adopted. Mr. Laws says that sewer gas should be practically unknown in Newcastle; he supplements his interesting report by detailing the various works his department has been engaged in, in their efforts to keep the public sewers, and the city generally, in as clean a state as circumstances will permit. If all the recommendations of Mr. Laws are carried out, many thousands of pounds will be spent in Newcastle on sanitary improvements before long. The proposal to do away with ashpits is exciting commotion amongst property owners; many of these receptacles having been formed during recent years, with the approval of, or in accordance with the plans of the corporation, officials, and landlords loudly protest against having again to pay the cost of new experiments in official sanitation.

THE SANITATION OF SHIPS.

At the last meeting of the River Tyne Port Sanitary Authority, held at Newcastle, Mr. Taylor, the inspector, said that during the previous two months he had visited a total of 2,114 British and foreign vessels that had entered the port. He had also made 125 extra visits. He had served notices on board eighty-eight vessels to abate nuisances or to remedy sanitary defects; all except two had complied with his requirements. But one case of infective disease had come under his notice during the above period. He had given attention to the smoke nuisance, not only on the river but on its banks, and was pushing investigations with a view to its abatement. It transpired that during the last twelve months the officers of the Authority had visited 10,000 ships, and had been the means of securing better ventilation and cleaning on board many of them, which, as Alderman Wilson, the chairman, remarked, had undoubtedly been productive of much good. The total estimated expenditure for the year was 1,400*l.*

TWO SIDES OF A QUESTION.

CONSIDERABLE excitement exists in South Shields relative to an effort that is now being made to obtain the removal of the works of the Tyne Alkali Company, in consequence of the deleterious gases which, it is alleged, frequently escape from them, to the injury of the public health. The Tyne Alkali Works have been long established in South Shields, and are now surrounded by a somewhat dense population. Public opinion is about equally divided as to the alteration or removal of the works. The numerous *employés* of the firm loudly protest against any interference with the works, which are proposed to be taken for street improvements.

A COURSE of weekly lectures on the Preservation of Health is now being delivered to ladies only, in the Lecture Room of the Literary and Philosophical Society at Newcastle-on-Tyne. They are well attended. An effort is being made to get up a similar course at South Shields.

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THE PUBLIC HEALTH

During November 1883.

ean temperature during last month at the Royal itory, Greenwich, was 43°·8; it was 1°·5 above rage November temperature in one hundred years, htly exceeded that recorded in the corresponding of last year. An excess of temperature prevailed nteen days of the month, while on each of the other days it was below the average. The warmest the month was the 20th, when the mean was as 51°·1, and 10°·2 above the average; the coldest s the 15th, when the mean was only 36°·4, and low the average. Rain was measured at Green- n twenty-one days during the month, to the te amount of 2·8 inches, which exceeded by inch the average November rainfall in sixty-one During the first eleven months of this year the amounted to 21·1 inches, which was 2·2 inches he average rainfall in the same period of sixty- irs. The sun was above the horizon during 264·4 luring November, and 61·2 hours of bright sun- were recorded at Greenwich; this amount con- ly exceeded the average in the corresponding of the five years 1878-82. South-westerly winds ed almost throughout the month. The amount of vas below the average of that recorded in the same of the five preceding years.

he twenty-eight large English towns now dealt the Registrar-General's Weekly Return, which estimated population of more than eight and a llions of persons, 22,153 births and 12,878 deaths gistered during the four weeks ending the 1st inst. nual birth-rate, which in the two preceding months en 33·3 and 34·1, declined again to 33·5 during ber, and was 2·6 per 1,000 below that which pre- n the corresponding period of last year. The lowest ites in these twenty-eight towns last month were Halifax, 28·1 in Plymouth, 28·2 in Bradford, and Brighton; in the other towns the rates ranged ls to 37·7 in Sheffield, 38·8 in Cardiff, 39·0 in , and 43·0 in Sunderland. In London the birth- t month was 33·1, and in the twenty-seven provin- vns it averaged 33·9.

annual death-rate in the twenty-eight towns, which en 19·5 and 19·7 in the two preceding months, rose to 22·6 during the four weeks of November, ost corresponded with that which prevailed in these in November 1882. The lowest annual rate of ty last month was 18·3, recorded in Norwich, and Plymouth. The rates in the other towns, in order from the lowest, were as follow:—Brad- 8·4; Brighton, 19·1; Portsmouth, 19·2; Wolver- n, 19·2; Leicester, 19·6; Hull, 20·4; Birming- 20·9; Sunderland, 21·5; London, 21·6; Bir- d, 21·6; Bristol, 22·3; Nottingham, 22·4; ld, 22·7; Halifax, 22·9; Bolton, 23·3; Hudders- 4·2; Preston, 24·5; Oldham, 24·8; Cardiff, 25·1; ool, 25·5; Salford, 25·9; Leeds, 26·3; Blackburn, Newcastle-upon-Tyne, 27·8; and, the highest rate the month, 30·6 in Manchester. While the death- London during November did not exceed 21·6 per it averaged 23·4 in the twenty-seven provincial

The 14,915 deaths from all causes in the twenty- owns during the four weeks of November included hich were referred to scarlet fever, 367 to measles, 'fever' (principally enteric), 243 to whooping- 220 to diarrhœa, 135 to diphtheria, and 35 to ox. In all, 1,857, or 12·5 per cent. of the total resulted from these principal zymotic diseases, o an annual rate of 2·8 per 1,000. This zymotic rresponded with that recorded in the preceding , and was below the rate from the same diseases in owns in the corresponding period of 1881 and 1882, it was 3·4 and 2·9 per 1,000 respectively. The death-rate in London from the principal zymotic diseases during November was equal to 2·7 per 1,000, and was slightly below the average rate in the twenty-seven provincial towns, among which it ranged from 0·5 in Wolverhampton, and 0·6 in Norwich, to 4·1 in Salford, 5·4 in Newcastle-upon-Tyne, and 6·4 in Leeds. Measles caused the high zymotic death-rate in Salford, and scarlet fever in Newcastle-upon-Tyne and Leeds.

Scarlet fever was the most fatal zymotic disease in the twenty-eight large towns during November. The rate of mortality from this disease in these towns, which in the six preceding months had increased from 0·36 to 0·64 per 1,000, further rose to 0·84 during November. In the corresponding periods of 1881 and 1882 the scarlet fever death-rates in these towns were 1·02 and 0·75 per 1,000 respectively. No death resulted from this disease last month in Norwich, Plymouth, Wolverhampton, Bolton, or Halifax; the scarlet fever death-rates in the other towns ranged upwards to 1·6 in Sheffield, 1·7 in Preston, 2·4 in Newcastle-upon-Tyne, and 4·5 in Leeds. The annual death-rate from measles, which had been 0·28 and 0·32 in the two preceding months, further rose to 0·56 last month; in London the rate of mortality from this disease was 0·56 per 1,000, and almost corresponded with the average rate in the twenty-seven provincial towns, among which it was equal to 1·3 in Manchester, 1·5 in Huddersfield, and 1·7 in Salford. The rate of mortality from 'fever' (principally enteric), which had been 0·31, 0·41, and 0·37 in the three previous months, was 0·46 last month, but was below the rates from this disease recorded in the corresponding period of the two preceding years, which were 0·53 and 0·55 per 1,000 respectively. In London the fever death-rate was 0·49, and in the twenty-seven provincial towns it averaged 0·43 per 1,000, but was equal to 1·0 in Cardiff, 1·1 in Preston, and 1·3 in Blackburn. The death-rate from whooping-cough, which in the corresponding months of 1881 and 1882 had been 0·56 and 0·39 per 1,000, was last month 0·37, but showed a considerable increase upon the rate recorded in the preceding month. In London the rate of mortality from this disease was equal to 0·36, and almost corresponded with the average rate in the twenty-seven provincial towns, among which it was equal to 1·4 in Brighton and 2·0 in Huddersfield. The diarrhœa death-rate last month was 0·33 per 1,000, and differed but slightly from the average rate in the same period of the three preceding years; it was, however, equal to 1·3 in Blackburn and 1·5 in Bolton. The 135 deaths referred to diphtheria during the four weeks of November were equal to an annual rate of 0·20 per 1,000, which showed a further increase upon the rates recorded in the three preceding months; while the rate of mortality from this disease was as much as 0·32 in London, it did not average more than 0·11 in the twenty-seven provincial towns. During the four weeks of November 35 fatal cases of small-pox were registered in the twenty-eight towns. Of these, 13 occurred in Sunderland, 9 in Birmingham, 8 in London, 2 in Liverpool, 2 in Wolverhampton, and 1 in Newcastle-upon-Tyne. During the past five months as many as 80 deaths from small-pox have been recorded in Birmingham. Judged by the returns of the Metropolitan Asylum Hospitals, the prevalence of small-pox in London showed an increase; the number of small-pox patients under treatment in these hospitals, which had been 60 and 41 at the end of the two preceding months, rose to 49 at the end of November. The average weekly number of new cases admitted to these hospitals, which had been 10, 9, and 7 during the three preceding months, rose to 12 during November.

The rate of infant mortality in the twenty-eight towns, measured by the proportion of deaths under one year of age to births registered, was equal to 162 per 1,000 during November, which exceeded that recorded in the corresponding period of either of the two previous years, when it was 144 and 156 per 1,000 respectively. In London the rate of infant mortality did not exceed 148 per 1,000,

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whereas it averaged 173 in the twenty-seven provincial towns, among which it ranged from 128 and 129 in Sunderland and Brighton, to 213 in Leicester, 221 in Halifax, and 231 in Huddersfield.

The death-rate from diseases of the respiratory organs, judged by the metropolitan returns, was in excess of that recorded in the corresponding periods of recent years. The average weekly number of deaths referred to these diseases in London during November was 439, and the annual death-rate was equal to 5·8 per 1,000, against 5·1 and 5·0 in the same periods of 1881 and 1882. In Liverpool last month the annual death-rate from these diseases was 6·3 per 1,000.

The causes of 372 of the deaths registered in the twenty-eight towns during the four weeks of November were not certified, either by a medical practitioner or by a coroner. These uncertified deaths were equal to 2·5 per cent. of the total deaths, which was below the rate in the same period of 1882. In London the proportion of uncertified deaths was only 1·3 per cent., whereas it averaged 3·4 in the twenty-seven provincial towns; all the causes of death were duly certified in Plymouth and Derby throughout the month; whereas the proportion of uncertified deaths was equal to 5·3 in Sheffield, 6·5 in Sunderland, 7·0 in Wolverhampton, and 12·0 in Halifax.

Among the population living in the outer ring of suburban districts around London, estimated at rather more than a million persons, the annual death-rate from all causes was equal to 17·8 per 1,000 during November, against 16·7 and 17·7 in the corresponding periods of 1881 and 1882. The annual death-rate from the principal zymotic diseases in these suburban districts, which had been 2·3 and 1·6 in the two preceding months, rose again to 1·9 in November. During the four weeks ending the 1st inst, 39 fatal cases of whooping-cough, 30 of scarlet fever, 29 of 'fever,' 23 of measles, 21 of diphtheria, and 13 of diarrhœa, were recorded in the outer ring. The fatality of each of these diseases, except diarrhœa, showed an increase. Sixteen deaths from scarlet fever, 12 from whooping-cough, 7 from diphtheria, and 6 from 'fever,' were recorded in the district of West Ham. Fifteen fatal cases of measles, 5 of diphtheria, and 3 of scarlet fever were registered in Tottenham sub-district.

CHEMISTRY AND SANITATION.—Mr. C. W. Stephens, sanitary inspector of Walsall, was elected a Fellow of the Chemical Society at the meeting on December 8. He was nominated by eight Fellows of the society, and his qualifications were stated to be his success as a student and his contributions to sanitary science. A paper written by Mr. Stephens on 'Disinfectants' will be found in the SANITARY RECORD for June 6, 1879. Mr. Stephens is at present the only inspector of nuisances entitled to write F.C.S. after his name. There can be no doubt, however, of the utility of the study of chemistry to sanitary inspectors, and we hope that many of Mr. Stephens's *confrères* may find time to follow his useful example.

WE learn from our excellent contemporary, the *Health Journal*, that several of the sanitary authorities on the south and east sides of Liverpool have combined to avail themselves of the provisions of Clause 19 of the Alkali, &c., Works Regulation Act, 1881, to appoint a special inspector of the alkali works in their districts, and have secured the services of Mr. John Affleck, D.Sc., one-third of whose salary will be paid by the Local Government Board.

MR. E. PRITCHARD, of Westminster, who has been called in by the Wolverhampton Corporation to devise plans for an extension of the deep sewerage, recommends alterations at the sewage farm at a cost of 22,500*l.*, and an outlay of 21,000*l.* in outfall works, besides purchasing another farm for sewering 780 acres of the borough at present not drained.

SPECIAL REPORTS.

EVERY-DAY SANITARY DOINGS.

By our ROVING COMMISSIONER.

PUBLIC opinion is now seriously awakened upon the question of house sanitation, and I find a great number of persons calling in the aid of the sanitary engineer and having the drainage of their houses thoroughly overhauled and made as perfect as practical knowledge and the best known appliances can make it. On the other hand, there are not wanting signs that the field of sanitary science will be invaded by a set of men possessing little, if any, practical knowledge of the work they attempt to carry out, and if due caution be not observed we shall suffer from the doings of the 'jerry' plumber as well as from his prototype in the building trade. Instances have been brought to my notice of this character, and I would advise all persons contemplating alterations in their sanitary arrangements to employ none but well-known firms for the work. I could mention many houses belonging to families of distinction that have undergone a complete change in their sanitary arrangements at the hands of some of your clients, but as private persons have an objection to their names being made public, I forbear to mention them. The firms who have executed the work have, however, in most instances, permission to privately show the result of their labours when they consider it necessary. Amongst the public institutions that have recently been remodified are the Sussex County Hospital at Brighton, the changes in which have been carried out by Messrs. Banner Brothers, of Billiter Square, E.C. It happens that for some time past complaints had been made of unpleasant smells making themselves apparent from the drains, which caused the authorities to decide upon having the entire sanitary arrangements rearranged. On making their openings the contractors found a cesspool no less than 140 feet deep, and further on some disgraceful work was brought to light. It would appear that the persons who originally laid down the drains must have been short of straight pipes, for I am told that in place of these, bends and curved pipes were fixed in many instances in utter defiance of all common sense; and from what was disclosed it appears certain the remodelling was not undertaken at all too soon. All this has now been altered, and the great cesspool filled up with lime and other suitable material, and 9, 6, and 4 inch pipes (according to requirement) laid down. All the soil-pipes from the building have been trapped with Banner's single dip traps, the soil-pipes acting as down draughts, exhausts being fixed about 18 inches above the traps, and fitted at the tops with 3-inch fixed finial ventilators. The main drains have been trapped with Doulton's ordinary siphons, with openings for inspection on shoulders, and fitted at bottom of manholes for easy access. Inlets for fresh air have also been provided at ground level, coming close to the siphon traps, and from the extreme or upper end of the branch main drains a 6-inch galvanised iron pipe has been carried to the highest point of the building, and fitted with a 6-inch Banner ventilating cowl, causing a good draught to enter the inlets before named, and sending a current through all the main drains. Banner's patent grease traps have also been fitted to all the sinks, and altogether the work which has been carried out by Mr. Thomas Griffiths, of Brighton, under the personal superintendence of Mr. A. E. Hubert, the manager to Messrs. Banner Bros., appears to be of a most satisfactory character.

In the Manchester district, Messrs. Harcourt, Thompson, & Co., whose system of ventilation by means of the ridge tile has been described in your columns, have been actively employed in applying their system to several notable buildings. Amongst these may be mentioned the different mills, weaving sheds, &c., of Messrs. Ryland & Sons. The application of this system to one of the buildings of this extensive firm was found to

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be so successful that it is being applied to all their others. Manchester architects, at least, appear to have been convinced of the value of Mr. Thompson's invention, as many of the buildings fitted with it have been specified for by gentlemen of repute; one of the new Board schools in the city offering an excellent example of its success. I may also mention that Mr. Thompson is now engaged in preparing a new set of plans for the proposed Manchester Ship Canal, which will present some features of a distinctive character.

Messrs. B. Giles & Co., of Blackheath, who a short time since remodelled the sanitary arrangements of the National Training School of Cookery at South Kensington, and have been appointed sanitary engineers to that institution, have been employed to remodel the sanitary arrangements and drainage of the Fish Kitchen Great International Fisheries Exhibition, have also executed some most satisfactory work in several large mansions in Surrey, Sussex, Hampshire, Berkshire and Kent which they have permission to show to any one interested. The firm have recently been brought into prominent notice as gas engineers, and were selected to fit up the kitchens at South Kensington with their apparatus on the occasion of the late Fisheries Exhibition. It was with their appliances that the whole of the cheap fish dinners were cooked, and the water for washing up and all other requirements provided. As an example of the work done, on Bank Holiday in August one ton eleven hundred-weight of fish was cooked, nine sacks of potatoes boiled, plates warmed at the rate of 700 in five minutes, hot water provided from 7 o'clock A.M. until 10.30 P.M., and dinners served to 4,106 persons, at a total cost of *1l. 7s. 6d.* for gas, or three for one farthing. Messrs. Giles have received a vote of thanks from the committee as a tribute to the success of their work, and it has been intimated to them by letter that a specially-worded diploma will shortly be sent them.

The numerous fires constantly occurring have caused some anxiety on the part of the authorities connected with public institutions, where works of interest and value are collected, and suitable precautions are in many cases being made to guard against outbreaks. Messrs. Merryweather & Son, the eminent fire engine manufacturers, have lately completed an elaborate system at the Royal College of Physicians, by which fire may be arrested in its earlier stages. The recent distressing disaster at Southall has caused the authorities and proprietors of other lunatic asylums to adopt more complete precautionary measures, and the firm in question have supplied their appliances, comprising the 'Chute' fire escapes, 'Tozer' fire pumps, and other appliances to—amongst others, the establishment at Ticehurst, Dr. Bower's, Springfield House, Mr. Bedford, Parkside Asylum, Colney Hatch Asylum and Dr. Stillwell's, Moorcroft.

Though not strictly a sanitary question, the subject I am about to speak of is fraught with importance to a large section of the population, I allude to the accidents that are constantly occurring through the upsetting of mineral oil lamps. When we consider the extent to which these 'illuminators' are used, particularly amongst the working classes, we may well shudder at the danger always present amongst them, that the slightest accident or carelessness, may result in serious injury or even death. There is little doubt that these mishaps are of more frequent occurrence than many of us imagine, but only the more serious cases find their way into the public prints. I know of one that happened recently where a girl of fifteen was seriously burnt, property in the room destroyed, and, but for timely assistance, a serious fire would have occurred. The house contained some four or five families, not one of which were insured. I have succeeded in prevailing upon two of the families to secure themselves against future loss from fire by taking out insurance policies for them, but protection against such accidents requires the serious consideration of those who are responsible for manufacturing the cheaper kind of lamps that are placed upon the market in thousands. All these lamps should invariably be made with broad bases, sufficiently large to make it impossible for them to turn over, whether they be manufactured of iron, bronze, or stamped brass. That large quantities are so made I am fully aware, but there is nevertheless an immense number made entirely of glass and similar material that are easily broken, and have light bottoms easily upset. These low-priced lamps are for the most part of foreign manufacture, got up in the very cheapest form, and consequently fraught with the dangers I have indicated. Until manufacturers will cease to make such trash, so long we shall be subjected to the accidents that occur from their use; but if, as we are constantly told, it is necessary to make such low-priced wares, it is incumbent on those who manufacture them, to endeavour to form the burners in such a manner that in the event of an overturn the light should be extinguished, and danger from burning be obviated even if the oil be spilt. I be told that this is easier said than done; nevertheless I am somewhat sanguine on the point. Some thirty years or more since, when camphine was the 'ruling spirit' for lamps, a small one—intended for a hand lamp or for night use—was introduced by a firm in the North of England that had a great 'run,' which only waned when camphine gave place to the present mineral oils. This lamp was made entirely of glass or of clear crystal, and not having a broad base was open to the objection perhaps of being easily overturned. To guard against danger, should this occur, the burner was peculiarly constructed. Instead of the cone or cap that regulates the combustion, forming a portion of the solid part of the burner whereon the globe and chimney rest, it was made as a loose or independent part and of cast metal, instead of being stamped from thin sheet material. The additional weight present in the cast cone was of great service. Supposing the lamp to be upset, this cone became an extinguisher, and falling over the light, as it was bound to do, it put it out, and so prevented danger from fire. I recollect trying many experiments with these lamps to see if the 'idea' was perfect, and never found it to fail. How far this same action would accomplish the desired effect in a larger burner and of different shape I am not prepared to say; but I ask all lamp manufacturers, in the interests of humanity, to endeavour to introduce a means to the required end, and I think they may be fairly assured of a remunerative return if their invention proves a success, and I shall be pleased to communicate with any manufacturer who feels disposed to try the experiment.

EXHIBITION OF BUILDING MATERIALS AND DOMESTIC AND DECORATIVE APPLIANCES AT BRISTOL.

AN exhibition of similar character to those now annually held at the Agricultural Hall and at Birmingham was commenced in the Rifle Drill Hall, Bristol, on November 26, and continued open until the 8th inst. It had the advantage of the able management of Mr. Philip Shrapnell, the manager and secretary to the others named, and may fairly be pronounced a success; the greatest drawback having been the confined area of the building, which prevented the admission of many exhibits that would otherwise have been shown. So numerous were the applications that Mr. Shrapnell was compelled to curtail the amount of space applied for by several firms for the purpose of obtaining a more representative collection. The exhibition was notable for having drawn together a number of local and West of England firms, not usually exhibitors on these occasions; for instance, the neighbourhood of Bristol contains many manufacturers of bricks and tiles, the clay of the district being well adapted for such articles, while the proximity of Bath, with its fine assortment of Bath or freestone, as well as other surrounding districts, offered an opportunity to quarry owners of exhibiting their materials at comparatively small expense. Amongst the brick and tile manufacturers were the Fishponds and Bedminster

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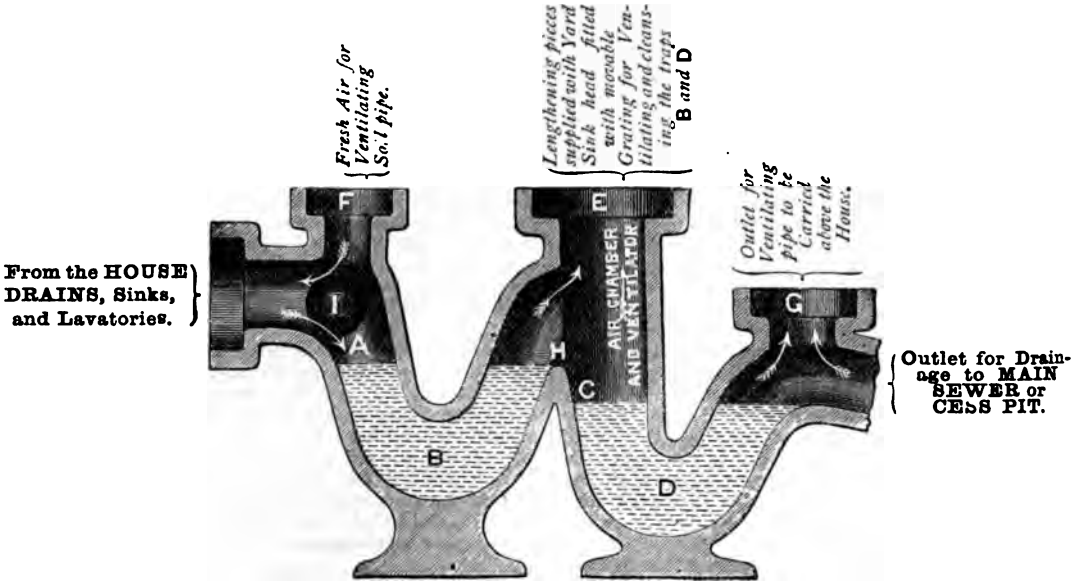
Brick and Tile Co., Bristol, H. J. & C. Major, Patent Tile Works, Bridgwater; W. M. Colchester Wemyss, Mitcheldean, Gloucestershire; J. B. Hammill, Bridgwater; the Cattybrook Brick Co., Limited, Almondsbury, Bristol; and the Shortwood Brick Co., Pucklechurch, Bristol; while Messrs. Pictor & Sons, of Box (a detailed notice of whose justly-celebrated stone was given in a recent number of the SANITARY RECORD); and Messrs. Stone Brothers, of Bath, showed some nicely-quarried examples of their different qualities.

The most extensive assortment of general terra-cotta goods was made by the noted firm of Candy & Co., Limited; the Great Western Potteries, Newton Abbot; the Marland Brick and Tile Works, and the Annery Pottery, Torrington, Devonshire. Their 'Granite vitrified' adamantine paving bricks, in grey, warm-tinted, buff, and white, for stables, yards, pavements, wharves, &c., appear to be well named, as they are damp proof, practically imperishable, cheaper than stone or other paving, and being grooved in the making, present a firm foothold, and from their whiteness reflect light, a matter of great importance in stables and other dark places, and in this respect an evident improvement on the black-looking paving materials hitherto in use. A variety of the same class of bricks were shown for other purposes, and specimens of white, cream, grey, and warm-tinted terra-cotta building bricks, ornamental and plain, for string courses, cornices, &c. These latter are of choice character, and may be used with good effect for facing, more especially as they are non-absorbent, and consequently not liable to get coated with a dark film of soot and dirt, which is generally found disfiguring our public and private buildings. Brieks of *true* terra-cotta, such as those made by Messrs. Candy & Co., and supplied at a moderate price, must (as they become known) be largely used, especially as every shower of rain will wash them clean and bright, there being no pores to retain sooty impurities. The glazed stoneware bricks of this firm are equally worthy of remark, and are made to any radius or section for sewers, tunnels, and similar purposes; are non-absorbent and vitreous. The display likewise comprised fire-bricks, lumps, and general fire goods, as well as a good assortment of terra-cotta chimney tops, including one of new design, of which report speaks favourably as a cure for smoky chimneys and down draught. The company's display of general and ornamental terra-cotta goods was of fine quality, and contained many good designs. Glazed sanitary stoneware was another important section in this exhibit, several excellent traps and sewer gas excluders being prominent. We select one of them for illustration as offering material advantages. This appliance, named the 'Registered' Sewer Gas Excluder, can be easily fixed to existing house-drains.

It will be seen that it contains an inlet for fresh air to ventilate the soil pipe, an inspection opening and a drain ventilator, as well as two deep water seal flush or cascade traps in one piece of glazed stoneware. It has no corners or angles for the collection of paper or soil; accumulations or clogging (as with many traps) do not take place; the filth is removed at each discharge or flush of water, effectually cleansing each of the traps. No syphonage can occur, each trap being well ventilated. The inspection shaft and air-chamber is so placed as to admit of easy examination of both the water seals from the one opening at E. They a re made in all sizes up to 9 inches diameter, and the prices seem exceedingly moderate.

The necessity of disconnecting house drains from the main drains is so thoroughly acknowledged that an appliance which can be relied on, such as the one in question, will prove a valuable addition to the repertory of sanitary goods.


Fresh Air for Ventilating Soil pipe.
Lengthening pieces supplied with Yard Sink head fitted with movable Grating for Ventilating and cleansing the traps B and D
Outlet for Ventilating pipe to be Carried above the House.
From the HOUSE DRAINS, Sinks, and Lavatories.
F
E
I
A
H
AIR-CHAMBER AND VENTILATOR
G
C
B
D
Outlet for Drainage to MAIN SEWER or CESS PIT.

The Silicate Zopissa Composition and Granitic Paint Co., Fish Street, London, E.C., exhibited through their Bristol agents, Messrs. Allen & Son, samples of their patent composition for rendering bricks, plaster and even textile fabrics, impervious to damp. It is a colourless liquid, and its effects upon the articles named appear to be of the most satisfactory character. Another materi shown by the firm is their granitic paint, some of which specially prepared for naval, colliery, and engineeri purposes, and wooden panels and iron-castings were exhibited coated with it. The advantages of this pai as its name implies, are its hard and lasting qua ties.

An extensive assortment of glass, comprising near every kind required in building or decoration, from t commonest street window glass to the finest pla enamelled, embossed, etched, &c., and stained glass f ecclesiastical purposes, was exhibited by the old-establish firm of John Hall & Sons, Broadmead, Bristol, Hi Street, Marylebone, London and Swinford, Gloucestershire. Being also silverers by the mercurial and p silver processes, examples of glass treated in this were exhibited, while the specimens of paints, meta oxides, and similar products of which Messrs. Hall are tensive manufacturers, occupied a prominent positi Amongst the specialities for which this firm are conside

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amous are fresco concrete cement paint, flint-stone wash, namel paint, and a permanent granitic paint.

Bristol has long been celebrated for its stoneware ottery, and the special colour and glaze affected by her anufacturers, has often been adopted by firms in other arts of the kingdom, and is called Bristol ware—a ompliment that may probably not always be appreciated y the originators. At this Exhibition Messrs. Price, ons, & Co., of the Old Stoneware Potteries, Bristol, firm of almost world-wide celebrity, upheld their repuation with their collection of stoneware goods, highly itrified, non-absorbent, and unaffected by climate. The pecimens consisted of bottles, jars, spirit barrels, &c., f all shapes and sizes, suitable for all purposes, and articularly for chemicals, acids, &c., many being made ith screw-stoppers; while electrical stone-ware formed nother section, including insulators, battery jars, and orous pots. The quality of the goods made by Messrs. rice & Sons is beyond dispute, and their bright and lean appearance assists in gaining for them the favour of he trade.

Mr. George Jennings, of Stangate, Lambeth, was the rincipal exponent of sanitary engineering goods, and his isplay was both comprehensive and, as usual, of a high rder of merit. It consisted of his various closets, lavaories, urinals, and other appliances, to which attention as been drawn in these columns on many occasions, and he collection of plumbers' brass and lead work left othing to be desired. Mr. Jennings has of late entered pon the manufacture of terra-cotta goods, and a collection f these, in the form of door and window dressings, string ourses, &c., were shown; a marked feature in this section as a handsome wheel window, nearly pure white.

A meritorious collection of electrical apparatus was contributed by Messrs. King & Co., Bristol, who also owed examples of electric lighting; their dynamo machine was driven by the Withers Gas Engine, manufactured y Messrs. Beynon & Cox, of Torquay.

The largest and most comprehensive display of general ardware goods was made by the firm of Alfred Gardiner & ons, of Bristol, one of the largest ironmongery firms in he West of England. The exhibit comprised a choice ollection of chimney-pieces and over mantels in marble, amelled slate, and wood, with richly appointed grates, erbs, and the usual appendages. Kitchen ranges of arious patterns went to make this section complete, together ith a collection of gaseliers, brackets, hall lanterns, &c., the prevailing styles. Conspicuous among the gastings were several examples in hammered iron of good esign, together with a group of ecclesiastical fittings, consting of iron and polished brass standard gas-fittings and oronas, and wrought-iron altar standards and railings, all ppropriately coloured. Another section was devoted to rought-iron window frames, weather tight casements, rong room doors, and similar articles, of which the firm re extensive manufacturers, employing on an average out one hundred hands in their make.

Messrs. Ashton & Green, of London, Dublin, and ristol, sent a fine collection of chimney-pieces in marble nd enamelled slate, of which latter they are extensive anufacturers, owning large quarries in North Wales, om which building slates are also sent out in immense uantities. They also exhibited a general assortment of uilding materials, in which they are extensive dealers.

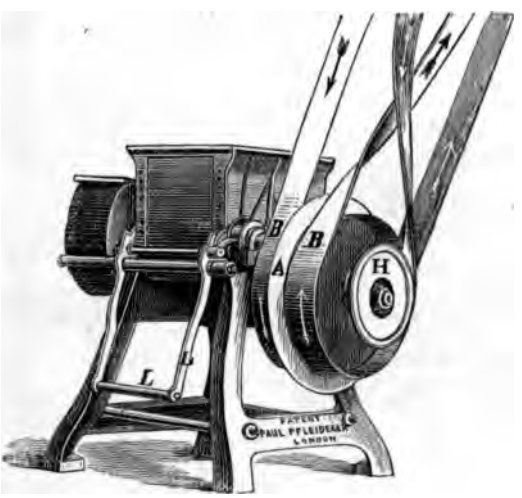
Messrs. W. H. Baxter & Co., Albion Street, Leeds, exhibited one of their patent knapping motion stone breakers, machine well adapted for the use of local authorities, as ell as contractors, quarry owners, &c. Being on wheels, can be easily transported, and a small gas-engine, where team is not available, will effectually supply the motive ower. It is said to crush six tons of road metal per our, is fitted with an improved screen, and so arranged hat the jaws, which are in halves, and other wearing arts can be easily renewed without skilled labour.

Messrs. Josiah Wedgwood & Sons, of Etruria, Stoke-on-Trent, sent a similar collection of tiles to that shown by them at the Exhibition of the Sanitary Institute at Glasgow. The improved method by which these tiles are made materially reduces their cost, enabling the firm to offer an article of a high artistic character at a similar price to which others of a more inferior or commonplace kind are now sold. Some of the exhibits were from the designs of Mr. Lewis F. Day, to whom was entrusted the design for the medal of the Fisheries Exhibition.

An extensive collection of artistic furniture was exhibited by Messrs. Trapnell and Gane, of Bristol and Cardiff. Two exquisite cabinets, one in rosewood, and the other in American walnut, with small plate-glass panels with bevelled edges, were conspicuous features, and two handsome sideboards were equally worthy of note. A fine chimney-piece of carved light oak with open mantel was quite as interesting in its way. Equally good designs in bedroom furniture and other articles were on view.

Weighing machines of various sizes and for different purposes were shown by Messrs. Bartlett & Son, of Bristol, an old-established firm of considerable repute. Their patent platform machines, showing the weight at a glance, are commendable appliances, and the quality of the goods made by them in general is such as may be confidently relied upon.

Mr. Paul Pfleiderer, of Farringdon Street, E.C., exhibited his Patent Universal Kneading and Mixing Machine, to which a word of praise may justly be accorded. Useful alike to the baker, the whitelead and colour maker, the printing-ink manufacturer, the lubricating grease preparer, the provider of carbons for the electric light, and for any purpose when large masses of material are to be kneaded, incorporated, or disintegrated, its name 'Universal' has been well chosen. As an example of its powers it is said that one of the sizes is capable of turning out 5 cwt. of putty in less than ten minutes, being discharged by simply tilting the trough, and manufactured in a superior manner



to that made by the old process. These machines are made in various sizes to work by either hand- or steam-power, and are simple in construction. For preparing dough for public schools, asylums, or other institutions where large quantities of bread are consumed they will be found a valuable adjunct, and may be confidently recommended to the authorities.

Enamelled slate mantelpieces were shown in great variety by Mr. Corfield Morgan, of Cardiff and Queenhithe, London. They were good in design, and had the further recommendation of being remarkably moderate in price. The imitations of the rare and expensive marbles reflect credit upon the artists employed, and several panels, consisting of landscapes, animals, &c., all produced by *employés* of the firm, show the advances which have been made in the art of painting on slate.

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A fine collection of cut and stained glass and of articles made of glass for domestic embellishment was shown by Messrs. S. Cashmore & Company, Victoria Street, Bristol. This firm holds a high reputation in their industry and have contributed extensively to the decoration of many notable buildings both at home and abroad.

Another local firm who devote their energies mainly to ecclesiastical work is that of Joseph Bell & Sons, College Green, Bristol, who exhibited designs of stained glass windows executed for Bristol Cathedral, Bath Abbey, &c. Others for domestic decoration were also shown of considerable merit.

Diespecker & Co., 40 Holborn Viaduct, contributed a collection, highly to be commended, of mosaic work, both for pavements and decorative uses. The designs comprised specimens of Venetian, Roman, Greek, and other patterns, supplemented with numerous drawings and plans for mosaic flooring.

Some very excellent specimens of joinery work were shown by Messrs. Brook & Bruce, St. Philip's, Bristol, containing some samples of work in course of preparation for the trade school of the Merchant Venturers' Society, now being built in Bristol. Other articles shown were window-sashes, doors, and various building wood-work made by the firm for ordinary contractors' or builders' use. The various examples clearly demonstrate that the firm are quite capable of holding their position against all comers, particularly in the essential point of quality.

Another local firm exhibiting joinery work was that of Mr. Long, of Bath, who sent amongst other things a portion of a staircase with balusters and newel post, now making for Clevedon Court, Somerset, which caused much admiration.

Messrs. John Watts & Co., of the Broad Weir Engine Works, Bristol, sent their patent asphyxiator for applying the smoke test to defective drains. We append an illustration of this apparatus, which is now

coming into very general use. The mode of application is very simple. A small quantity of sulphur or smoke paper is placed in the combustion chamber, and ignited from the top. By rotating the fan the fumes will be forced to almost any distance through the drains or other places where it is applied, causing in the case of drains an immediate detection of any imperfect places. It is equally effective for the destruction of rats or other vermin in holes, or for making rabbits desert their burrows. It may be used for the fumigation of greenhouses with the same success as well as for disinfecting and deodorising purposes, and may be pronounced to be the simplest and safest means for the uses we have named. Sanitary authorities in various parts of the country are patronising this invention to a large extent, and there is no doubt that the drainage of a house may be tested by it in a reliable manner without the trouble or expense of opening the ground or disturbing the drains.

Messrs. J. L. Bacon & Co., Upper Gloucester Place, London, N.W., whose system of hot-water heating was described at length in the SANITARY RECORD of October 15, on the occasion of the firm exhibiting at the Exhibition of the Sanitary Institute at Glasgow, were present with a similar collection of their appliances, and were the only firm dealing with this question in an exhaustive manner throughout the Exhibition.

Mr. R. Adams, Great Dover Street, Borough, whose unique domestic inventions have been frequently noticed and illustrated in these columns, sent a similar collection to the Bristol Exhibition. One or two new articles were also shown, notably the Norton Door Check and Spring, an American invention, for which Mr. Adams has secured the London agency. The intention of the Norton check is, while securing the latching of any door to which it is attached, to prevent the objectionable slamming so common to those having springs attached to them. The spring is so arranged, that after the door is opened and released from the hand it expends its greatest force before it reaches the frame work and striking plate of the lock, and it closes itself as gently as if carefully fastened by the hand. On a future occasion an illustration of this improved contrivance will be submitted to our readers. Mr. Adams having been so successful with his patent fan light opener, has recently introduced a new one for double windows, which he exhibited at Bristol. This, too, will hereafter be illustrated. Another new invention was an improved hub for bicycles or tricycles, enabling a rider even when on a tour to remove a broken spoke of his wheel without the annoyance, loss of time and expense now incurred by drilling out the ends of the broken one. This hub is so simply constructed that a mere novice can accomplish the work, and it must prove a great boon to all who use the 'steel horse.'

Messrs. Clark, Bunnett, & Co., Rathbone Place, Oxford Street, exhibited the Kaio Kapnos Grate, which was shown at the Smoke Abatement Exhibition at South Kensington, and attained excellent results as a smoke-consuming grate, as reported at the time. Their other exhibits consisted of a handsome spiral staircase, several lifts, a speciality with the firm, examples of their revolving shutters, for which they have secured a great reputation, and samples of metallic Venetian blinds and corrugated iron buildings.

The Bower Barff Rustless Iron Company, Limited, Queen Victoria Street, E.C., had a very interesting stand containing specimens of a variety of iron goods, from cooking utensils to decorative articles, all treated by their patent process, securing them against rust. The advantage of this invention has been treated of on previous occasions in the columns of the SANITARY RECORD, and it may be hoped that it will be more fully appreciated in process of time.

The Willesden Patent Metallic and Rot-proof Paper and Canvas, in a variety of useful applications, was shown by the local agents, Messrs. Mardon, Son, & Hall, of Bristol, amongst the specimens being a model of the fish-market erected by the Company at the Fisheries Exhibition; a model boat, fitted with sails of the material; several samples of metalline papers, for decorative purposes; others for roofing and underlining; and a small pavilion, constructed of metalline paper and canvas. The uses to which this material may be applied appear to be almost universal; and, as a security against weather, we may point to the fish market at South Kensington, as offering a fair example of its utility. For temporary hospitals, camping out, &c., it offers peculiar advantages, its extreme lightness, ease of transport and small cost of carriage, being superior to any other material suitable for such uses.

Captain Papier, of Church Road, Islington, exhibited his patent 'Zenith' air or steam screw propeller, adapted for all kinds of ventilation, which has been largely utilised by many of the leading architects and builders. It differs but slightly from many other systems now in use, and appears to answer the purposes for which it is intended in an effective manner.

Messrs. Hodkinson & Clarke, Small Heath, Birmingham, occupied a large space with the principal articles of their manufacture. Prominent among these was the pretty house (always an attractive feature in their exhibits), fitted with the various blinds, comprising wood, metallic, textile

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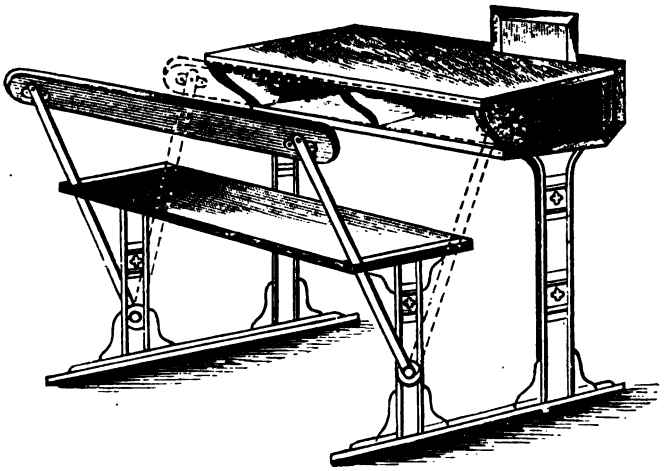
ained glass, all being specialities, to which verted on previous occasions. The firm sive makers of school furniture, of which t specimens were shown, two of which below. The first (the 'Canadian' Re-

burners, lanterns, &c., shown for the purpose of illustrating his system of gas lighting, which has been frequently noticed in the SANITARY RECORD. Mr. Heron manufactures a gas lantern that will give the light of 2,000 candles.



Rail Dual Desk) is a very useful appliance. back to the seat for the pupil when at work, ent of the room being required for readings e seat can be thrown back against the desk, the dotted lines, when another, facing the of the room, is thus formed. The second is aster's desk, made with either drawers or a

the sides, and generally mounted upon ing it to be readily moved from place to sities arise. There were, in addition, several and seats, all presenting some points of ergarten seats and desks were also exhibited, f the makers appears to be to provide school the most suitable kind for modern require- s and lifts are another speciality with Messrs. Clarke, and they exhibited one with what is saving arrangement, brought into action only of the rope or chain sustaining the weight hould this happen, the carrying bar holding nds to a level on the top of the cage, this ng two powerful volute springs, which operate s, bringing them into position against the e lift; this action prevents the cage from rther, and so prevents accident.

as Heron, London Road, Manchester, was his usual assortment of duplex and triple gas-

In grates, Mr. James B. Petter, of Yeovil, was the only person whose exhibit was strictly confined to one article, and this was his patent Nautilus grate, of which, however, he introduced several sizes and patterns. This unique invention was first exhibited at the Smoke Abatement Exhibition, and the columns of the SANITARY RECORD were the first to give publicity to it. As then, it still remains the most novel arrangement of an open fire-grate ever introduced. Two illustrations of it are appended, one showing it as fitted in a fireplace, and the other on a larger scale, in one of the ornamental designs in which it is manufactured. In shape, as

the drawing depicts, it resembles the nautilus shell from which it takes its name; and is made with two side flues or one or two back ones. But the writer prefers the side ones in which he first saw it to the newer arrangement, and is inclined to think that for a smoke-consuming grate the side flues are the best to effect

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the object. Being lined with fire-brick, and having no bars, there is nothing to obstruct the flow of radiant heat;

and from the circular form of the top the evolved gases curling around it are mainly consumed before they enter the chimney. There is probably no grate introduced at the Smoke Abatement Exhibition that has secured such a success as the Nautilus; and it is a fact worth noting that the most original appliances, both in coal grates and gas-heating and cooking stoves, have proceeded from houses in the West of England.

The Eagle Range Company exhibited the kitchen ranges bearing their name, and Messrs. Whyte & Bradford, Bo'ness, Scotland, the new revolving fire range, recently exhibited at the meeting of the Sanitary Institute at Glasgow, and which was mentioned in the SANITARY RECORD report of that Exhibition.

Gas appliances were fairly represented, no less than three gas engines being exhibited as well as a variety of heating and cooking appliances. In the two last-named, Messrs. John Wright & Co., Birmingham, and H. & C. Davis & Co., Camberwell, had a general assortment of their manufactures which have been described at length on other occasions. Messrs. Beynon & Cox.'s, of Torquay, ventilating and heating gas stove excited much attention and is rapidly coming to the front. Their cooking stove (which appeals to the liking of those who object to gas being inside the oven and so coming in contact with the viands) had also many interested admirers. The principle of both of these appliances has been illustrated and described in previous numbers of the SANITARY RECORD, but there was a decided superiority in their finish and appearance at this Exhibition. Another feature in their display was Withers' gas engine, which has been considerably improved since its first appearance at South Kensington. The one exhibited was of 1-horse power, and was used for driving a dynamo machine in producing the Swan electric light. We hope on a future occasion to be enabled to illustrate this invention.

Messrs. Joseph Davis & Co., manufacturing opticians to the Board of Ordnance, Kennington Park Road, London, contributed an excellent collection of draining and other levels and surveying instruments, water-testing instruments, and a commendable sewer-gas detector. An assortment of their popular Royal Polytechnic barometers helped to make up a very effective display.

Mr. Henry Masters, architect of Bristol, whose contributions to the SANITARY RECORD will be remembered by our readers, exhibited through Messrs. Gardiner & Sons an interesting condensing and evaporating gas heater on the tubular principle for warming public buildings, &c., which possesses some meritorious points.

The Bristol Waggon Works Company were present with a well-built London-pattern builders' van to carry two tons, made with patent axles and other modern improvements, and mounted upon five springs; and a 'Margetson & Heks' patent tip-cart, which is confidently recommended to the notice of local boards and corporate authorities. It is made to carry 30 cwt., and so arranged that the cart can be held in position at any angle in tipping the load; and when canted to its extreme point the body does not come into contact with the ground. It is also made with other little improvements, tending to ease the horse and economise the wearing parts of the cart. The well-earned popularity of this firm is a sufficient guarantee for the quality of everything proceeding from their works.

INTERNATIONAL HEALTH EXHIBITION, LONDON, 1884.

Patron, Her Most Gracious Majesty the Queen. *President*, His Royal Highness the Prince of Wales, K.G. *Executive Council* (appointed by His Royal Highness the President)—*Chairman*, His Grace the Duke of Buckingham and Chandos, G.C.S.I.; *Vice-Chairman*, Sir James Paget, Bart., F.R.S.; Edward Birkbeck, Esq., M.P., George Buchanan, Esq., M.D., F.R.S., Sir F. Philip Cunliffe-Owen, K.C.M.G., C.B., C.I.E., Sir Joseph Fayrer, K.C.S.I., M.D., LL.D., F.R.S., the Marquis of Hamilton, Ernest Hart, Esq., Sir John Lubbock, Bart., M.P., F.R.S., Samuel Morley, Esq., M.P., G. V. Poore, Esq., M.D., Sir John Rose, Bart., G.C.M.G.; *Secretary*, Edward Cunliffe-Owen, B.A.

HEALTH.

FOOD, DRESS, THE DWELLING, THE SCHOOL, AND THE WORKSHOP.

EDUCATION.

APPARATUS USED IN PRIMARY, TECHNICAL, AND ART SCHOOLS.

It is proposed to hold, during the year 1884, an International Health Exhibition, which shall also illustrate certain branches of education, and which will occupy the buildings at South Kensington erected for the International Fisheries Exhibition.

The object of the Exhibition will be to illustrate, as vividly and in as practical a manner as possible, food, dress, the dwelling, the school, and the workshop, as affecting the conditions of healthful life, and also to bring into public notice the most recent appliances for elementary school teaching and instruction in applied science, art, and handicrafts. The influence of modern sanitary knowledge and intellectual progress upon the welfare of the people of all classes and all nations will thus be practically demonstrated, and an attempt will be made to display the most valuable and recent advances which have been attained in these important subjects.

The Exhibition will be divided into two main sections—Division I., Health; Division II., Education; and will be further sub-divided into six principal groups.

In the first group it is intended specially to illustrate the food resources of the world, and the best and most economical methods of utilising them. For the sake of comparison, not only will specimens of food from all countries be exhibited, but the various methods of preparing, cooking, and serving food will be practically shown. The numerous processes of manufacture connected with the preparation of articles of food and drink will thus be exemplified; and, so far as the perishable nature of the articles will admit, full illustrations will be given of the various descriptions of foods themselves.

In the second group, dress, chiefly in its relation to health, will be displayed. Illustrations of the clothing of the principal peoples of the world may be expected; and a part of this Exhibition, which, it is anticipated, will be held in the galleries of the Royal Albert Hall, will be devoted to the history of costume.

In the third, fourth, and fifth groups will be comprised all that pertains to the healthful construction and fitting of the dwelling, the school, and the workshop; not only as

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respects the needful arrangements for sanitation, but also the fittings and furniture generally in their effect on the health of the inmates. The most improved methods of school construction will be shown, and the modes of combating and preventing the evils of unhealthy trades, occupations, and processes of manufacture will form portions of the exhibition.

The sixth group will comprise all that relates to primary, technical, and art education, and will include designs and models for school buildings; apparatus and appliances for teaching; diagrams, text-books, &c. Special attention will be directed to technical and art education, to the results of industrial teaching, and to the introduction of manual and handicraft work into schools.

The following is a general classification of the six groups:—

DIVISION I.—HEALTH.

Group I.—Food and Drink. Selected foods and preserved food products; the supply and economic distribution of wholesome and nourishing food and drink; the conveyance of fresh provisions; the detection of adulterations and impurities; food analyses and food constituents; cooking and practical dietetics, including varieties of diets consumed by different nations; new descriptions of food; food for the young and for invalids; army and navy rations; prison and workhouse diet; domestic economy.

Group II.—Dress for all Climates for Both Sexes and for Various Purposes.—Examples of national costume of all classes—retrospective and modern collections; new and improved wearing apparel, and designs and materials for the same; specimens of improvements in the design, material, and the making of clothing and cheap dresses; dress for exercise and sport; uniforms; life-saving and fire-proof dress.

Group III.—Dwellings for all classes, their sanitary construction, fittings, and appliances. Improved materials for external and internal construction; damp courses; non-conductors for walls and roofs; wall linings and cements; non-poisonous paints and paperhangings; solid floors; washable materials for construction and decoration; ventilation of houses and apartments; air cooling, heating and purifying apparatus; apparatus for heating and for the abatement of smoke; heating by open grates and stoves; hot air, steam and gas apparatus; improved kitcheners and gas cooking stoves; lighting by gas and electricity, fittings and apparatus for the same; fire prevention—extincteurs, hydrants, escapes, preservative solutions; water supply, and improved sanitary fittings connected therewith—meters, cisterns, filters, softening apparatus, baths and lavatory apparatus and fittings; house drains, their construction and ventilation; closets; sewer disconnection—sinks, traps, gullies; the disposal and utilisation of house refuse.

Group IV.—Schools.—Buildings for town and country schools; yards and playhouses for schools; fittings for school latrines and lavatories; heating, lighting, and ventilation of schools; apparatus for physical training, gymnasia; school kitchens; storing of hats, cloaks, &c.; drying ditto in wet weather; isolation of diseases in schools; school infirmaries.

Group V.—Workshops and Factories.—Models and designs for improved workshops, especially those in which unhealthy, noxious, or dangerous trades and processes are carried on; improved apparatus and plant for the same; guards, screens, special dresses, and objects for personal wear to avoid or prevent injury from manufacturing processes; illustrations of special diseases and deformities caused by unwholesome trades and occupations; means of guarding against the same; new inventions or improvements for the better carrying on of dangerous or unhealthy processes of manufacture; models, diagrams, &c.

DIVISION II.—EDUCATION.

Group VI.—Educational Works and Appliances.—Apparatus and fittings for crèches and infant schools; appliances for teaching; Kindergarten models, and examples and results of instruction; primary school fittings and apparatus; examples and models for teaching practical manual work to girls, and various handicrafts to boys; apparatus and models for science teaching; apparatus and models for art teaching; designs and fittings for apprenticeship and industrial schools; apparatus for instruction in such schools; specimens of work done in these schools; schools for the blind and for the deaf and dumb; apparatus and results of teaching in such schools.

*** It is proposed to arrange collective exhibits in connection with some of the above classes, illustrating, among other subjects, the dwellings of the poor, the care in the dwelling for the welfare of the children and of the sick, model nurseries, sleeping apartments, completely fitted kitchens, fully equipped gymnasia for adults and for the young, model laboratories and collections for health-teaching, model schools, workshops, &c., and also collections having reference to special trades.

It is also proposed to hold an international congress in June or July next, on each of the main sections of the Exhibition—Health and Education.

Lectures will be given, and conferences will be held on the various subjects illustrated in or cognate with the Exhibition; they will be explained by practical demonstrations and experiments, and reports on each group will be issued.

Processes will be shown in actual operation, and practical tests will, from time to time, be made of the inventions submitted to the juries.

CLASSIFICATION OF SECTIONS.

DIVISION I.—HEALTH.

Group 1.—Food.—Class 1. Selected displays of unprepared animal and vegetable substances used as food in various countries. Stuffed specimens of animals, birds, &c. Models, drawings, and illustrations of the same. Class 2. Prepared vegetable substances used as food, including tinned, compressed, and preserved fruits and vegetables. Bread, cakes, and biscuits of all kinds. Class 3. Prepared animal substances used as food in a preserved form—tinned, smoked, salted, compressed, and prepared animal foods of all kinds. Food produced by insects, such as honey, &c. Class 4. Beverages of all kinds—(*a*) alcoholic; (*b*) non-alcholic; (*c*) infusions (tea, coffee, cocoa, chocolate, &c.). Class 5. New varieties of food, food for infants, food for invalids, new concentrated foods of all kinds. Class 6. Cookery practically demonstrated. Economical cooking, workmen's and other kitchens, cheap restaurants, bakeries, cafés, foreign cookery, &c.* Class 7. The chemistry and physiology of food and drink. The detection of adulteration, materials used as adulterants, analyses, food constituents and equivalents, tables, diagrams, &c. Class 8. Diseases due to unwholesome and improper food. Drawings and models of animal and vegetable parasites, &c. Class 9. Practical dietetics. Army and navy rations, prison and workhouse diet, foreign dietaries, &c. Class 10. Publications and literature, models and diagrams relating to Group 1. Class 11. Apparatus and processes for conserving, storing, conveying, and distributing fresh food of all kinds. Class 12. Machinery and appliances for the preparation of articles under Group 1.

Group 2.—Dress. (NOTE.—It is proposed to display the collections included under this group in the galleries of the Royal Albert Hall.)—Class 13. Collections illustrative of the history of dress, national costume, &c. Class 14. Waterproof clothing, India-rubber, gutta percha, &c. Class 15. Furs, skins, and feathers. Dresses for extreme climates, &c. Class 16. Dress for sport, hunting suits, &c. Class 17. Life saving dress. Divers' dress. Fire-proof dress. Class 18. Publications and literature relating

* *Special Notice.*—As refreshments come within the scope of this Exhibition, all methods of preparing the same, whether by cookery or otherwise, and the display and sale thereof, will be matters of separate arrangement with those wishing to be represented in this section of the Exhibition.

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to Group 2. Patterns, statistics, diagrams, models. Class 19. Machinery and appliances for the preparation of articles under Group 2.

Group 3.—*The Dwelling-house.*—Class 20. Dwelling models, and designs for the same, and specimens of buildings erected in the grounds. Fittings and accessories for dwelling-houses. Completely fitted apartments. Class 21. Water supply and purification.—Meters, filters, water-fittings, cisterns, baths, lavatories, apparatus, sinks, &c. Class 22. House drains, their construction and ventilation. —Sewer disconnection; sinks, traps, gullies; the disposal and utilisation of house refuse. Class 23. Water and earth closets, ash closets, commodes, urinals, disinfecting powders and fluids, insect destroyers. Class 24. Grates, stoves, kitcheners, ranges, boilers, &c., for domestic use. Apparatus for heating and warming, smoke abatement, &c. Class 25. Ventilators, air-inlets and outlets, cubic space of rooms, cowls, air straining and cleansing. Class 26. Lighting apparatus.—(*a*) Electrical apparatus for illumination and domestic use, secondary batteries, electroliers, accumulators, &c.; (*b*) apparatus for lighting by gas, gas producers, gas meters, gas fittings, chandeliers, &c.; (*c*) oil and other lamps, and stoves; mineral oil, wax and other candles, vegetable and animal oils. Class 27. Fire prevention apparatus—extincteurs, portable engines, domestic fire escapes, &c. Class 28. Materials for sanitary house construction—roofs, walls, damp courses, solid floors, damp proof wall coverings, cements, &c. Class 29. Materials for sanitary house decoration, non-poisonous paints and wall papers, floor coverings, washable decoration, &c. Class 30. Objects for internal decoration and use in the dwelling. Fittings and furniture. Class 31. Personal hygiene and care of sick. Materials for 'first aid' ambulance apparatus, furniture and appliances for the sick room, bathing requisites, detergents, couches, beds, invalid chairs, &c. Class 32. Publications, models, pictures, diagrams, &c., and literature relating to Group 3. Class 33. Machinery relating to Group 3.

Group 4.—*The School.*—Class 34. Designs and models of improved buildings for elementary schools, infant schools, and crèches. Class 35. Apparatus and fittings for warming, ventilating, and lighting schools, school latrines, closets, &c. Class 36. Special school fittings for storing and drying clothing. Class 37. School kitchens and arrangements for school canteens. Methods of warming children's meals, &c. Class 38. Precaution in schools for preventing the spread of infectious diseases, school sanatoria, infirmaries, &c. Class 39. Special apparatus for physical training in schools, gymnasia, apparatus for exercise, drill, &c. Class 40. The literature relating to classes 30 to 35. Models, statistics, diagrams, &c.

Group 5.—*The Workshop.*—Class 41. Designs and models for improvements in the arrangements and construction of workshops, especially those in which dangerous or unwholesome processes are conducted. Class 42. Apparatus and fittings for preventing or minimising the danger to health from carrying on certain trades. Guards, screens, fans, air-jets, preservative solutions, washes, &c. Class 43. Objects for personal use.—Mouth-pieces, spectacles, dresses, hoods, &c., for use in certain unhealthy and poisonous trades. Class 44. Illustrations of diseases and deformities caused by unwholesome trades and professions. Methods of combating these diseases. Preservative measures, &c. Class 45. Sanitary construction and inspection of workshops and factories. New inventions or improvements for ameliorating the condition of life of those engaged in unhealthy occupations. Class 46. The Literature of the subjects included under Classes 37 to 41. Statistics, disgrams, &c.

Division II.—Education.

Group 6.—*Educational Works and Appliances.*—Class 47. Crèches and infant schools.—(*a*) Apparatus and fittings for crèches and infant schools; (*b*) Games, toys, and Kindergarten amusements; (*c*) Models and appliances for teaching; (*d*) Examples of school work. Class 48. Primary schools.—(*a*) Apparatus and fittings; (*b*) Models and appliances for teaching; text-books, diagrams, and examples; (*c*) Specimens of work done in elementary schools. Class 49. Domestic economy in schools for girls.—(*a*) Models and apparatus for the teaching of cookery, housework, washing and ironing, needlework, and embroidery, dressmaking, artificial flower-making, painting on silk, pottery, &c.; (*b*) Specimens of school work. Class 50. Handicraft teaching in schools for boys.—(*a*) Apparatus and fittings for elementary trade teaching in schools; (*b*) Specimens of school work. Class 51 Science teaching.—(*a*) Apparatus and models for elementary science instruction in schools; Apparatus for chemistry, physics, mechanics, &c.; (*b*) Diagrams, copies, text-books, &c.; (*c*) Specimens of the school work in these subjects. Class 52. Art teaching.—(*a*) Apparatus, models, and fittings for elementary art instruction in schools; (*b*) Diagrams, copies, text-books, &c.; (*c*) Specimens of art work, modelling, &c., in schools. Class 53. Technical and apprenticeship schools.—(*a*) Apparatus and examples used in primary and secondary schools for teaching handicrafts; (*b*) models, plans, and designs for the fitting up of workshop and industrial schools; (*c*) Results of industrial work done in such schools. Class 54. Schools for the blind and for the deaf and dumb.—(*a*) Apparatus and examples for teaching; (*b*) Specimens of school work. Class 55. Literature, statistics, and diagrams relating to group 6 and to the effects of 'cramming' and overwork on the young, &c. Class 56. Collective displays of school work and appliances.

OPEN SPACES AND RECREATION GROUNDS IN LONDON.

The Metropolitan Public Garden, Boulevard, and Playground Association, the object of which is the provision of 'breathing and resting-places for the old and playgrounds for the young in the midst of densely populated localities,' has just completed the first year of its existence. Lord Brabazon, the chairman and hon. treasurer of the association, 83 Lancaster Gate, in his report of the year's work it has accomplished, or assisted others to do, mentions the planting of twenty plane trees in the Mile End Road, at a cost of 40*l.*; the erection of a gymnasium in Wild Street, Drury Lane, Board School, at an expense of 300*l.*; successful opposition to the inclosure by the Lords of the Manor (Ecclesiastical Commissioners) of a common of over 22 acres in extent, called 'Little Scrubbs,' Hammersmith; and the successful opposition to the proposal of the London and North-Western Railway Company to acquire the disused St. James's burial-ground, Hampstead Road, of which they were only conceded a small corner, the remainder being transferred to the St. Pancras Vestry, to be laid out by them as a public garden. Other achievements were the utilisation as a public garden of the disused burial-ground of St. Andrew, Holborn, at a cost of 1,200*l.*; the opening to the public of part of the private inclosure in Regent's Park; the placing of ornamental seats in St. Margaret's churchyard, Westminster; and the erection of gymnastic apparatus in the playground attached to St. John's Church, Waterloo Bridge Road. The association gave 100*l.* to the Kyrle Society for laying out St. George's, Bloomsbury, burial-ground. Among the objects in which the association is now actively interested are, opening the disused burial-ground of St. Bartholomew's Church, Bethnal Green, as a public garden; obtaining land for a public garden in Paddington; throwing open to the public Golden Square, Soho; the opening of the ground surrounding St. Pancras Church, Euston Square, as a public garden; the opening of Benjamin Street disused burial-ground, Farringdon Road; the opening as a public garden of the land surrounding St. Philip's Church, Stepney; the conversion of the disused burial-ground adjacent to Whitefield Congregational Chapel,

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Tottenham Court Road, into a public garden; the utilisation of the disused burial-grounds of St. Luke's, Chelsea, St. Paul's, Deptford, and St. Giles's, Camberwell, in a similar way; the acquisition of a public park of 50 acres for South-east London at Pepys's Hill, New Cross; and the proposed formation of public parks at Paddington and Kilburn. Lord Brabazon, puoting Dr. Hoffman's report to the Home Office 'that disused burial-grounds should, for sanitary reasons, be turfed and planted with flowers and shrubs, and permanently kept in good order,' points out the disposition shown by speculative builders to obtain these open spaces for building purposes. The Metropolitan Open Spaces Act, 1881, affords facilities for the utilisation of disused burial-grounds in the interest of the public health; and of this fact the association has reminded clergy and ministers of all denominations, as well as the local authorities of the metropolis. The members of the association, numbering 160, include her Royal Highness Princess Frederica of Hanover and Baron von Pawel Rammingen, the Marquises of Salisbury, Hertford, and Northampton, Lords Aberdeen, Cowper, Stanhope, Meath, Carysfort, and Lathom, Lord G. Hamilton, M.P., the Bishops of Cochester and Bedford, the Right Hon. H. Fawcett, M.P.' Sir Andrew Clark, M.D., Mrs. Gladstone, Professor Tyndall, and Archdeacon Farrar. Hitherto the receipts have altogether amounted to 767*l.* 12*s.* 5*d.*, all of which has been disbursed, and there is now a deficit of 7*l.* odd. The hon. treasurer appeals for members and subscriptions in furtherance of the good and necessary objects the association has been formed to promote.

At the last meeting of the members of this Association, Captain Thompson (the secretary) announced that he had been in communication with the leaseholder of Marlborough Square, Chelsea, and had received permission for the association to do what they pleased to improve that spot for the public benefit. He further reported that he had applied for an acre and a half of the site of Horsemonger-lane gaol as a recreation ground for the poor of the Borough. The letter would be considered at the next meeting of the Surrey justices, and from private information he had received he believed the request would be granted. In that case the ground would be divided into three parts—for infants, girls, and boys—and the local authorities would share with the association the expense of keeping the place in order, and providing a giant-stride and other gymnastic apparatus. In compliance with the wish of the members, he had written to the Metropolitan Board of Works, and the owners of several vacant building sites, asking permission to erect gymnasiums upon them, and throw them open as places of recreation for the poor. He also intimated that the association would give them up at any time on receiving fourteen days' notice. He regretted to say that the applications had been refused. With regard to the 'Cross Bones' Burial Ground in the Borough, the Home Secretary had been memorialised to prohibit the ground being used for building purposes, on sanitary as well as moral grounds. The last interment took place there thirty years ago. An offer had been made to the authorities of the burial ground in High Street, Lambeth, to place six seats in it if they would throw it open to the public. As yet no decision had been arrived at. The Vicar of Battersea informed the meeting that he had been in communication with Mr. Deputy Bedford on the subject of the throwing open of Bunhill Fields burial-ground, and Mr. Bedford had promised to bring the matter under the notice of the Corporation. The secretary then announced that since the last meeting a grant of 10*l.* had been made for the purchase of gymnastic apparatus for the St. James's Bermondsey National School. It was resolved to apply to the St. George's Vestry asking them to throw open the burial-ground in Bayswater Road for the use and enjoyment of the public, and to issue notices announcing that it was free to the public. Miss Gladstone said the ground had always been free to the public, but very few persons knew of it. The gates were always closed, and persons wishing to go in had to knock at them, and sign their name in a book. Several other matters were dealt with, and the proceedings terminated with the passing of a vote of thanks to the chairman, Mr. Ernest Hart.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

BEDFORD URBAN AND RURAL.—Dr. Prior points with no little satisfaction to the fact that the death-rate of Bedford during the past two years has been as low as 15·6 and 15·3 per 1,000 respectively. During 1882 the number of deaths properly due to the district was 300. Of these 72 occurred in infants under twelve months, 101 in children under five years, and 76 in persons aged 65 and upwards. It is recorded as a fact, unique in the experience of the health officer, that these proportions are not so favourable as those usually found when the entire death-rate is so low. Taking the two years 1881 and 1882, the proportions are reversed, since in the latter there was an increased infant and childhood mortality, with a diminished number of deaths amongst the aged, and yet the whole mortality was somewhat lessened. During the year under notice 30 persons lost their lives from zymotic disorders, diphtheria accounting for 9, whooping-cough for 8, and scarlatina for 3 deaths. Although in the town enteric fever was not fatal in any one case, the rural district was visited with two severe outbreaks of this disease. In the epidemic at Thurleigh, Dr. Prior thinks the diffusion of the disease can be accounted for by the opportunities of direct and indirect contagion, possibly through infected clothing, a fact of more than usual interest, owing to the scepticism which exists in some quarters as to the contagiousness of enteric fever. No unusual circumstance was noted in connection with the second outbreak, from which three deaths were recorded. In referring to the prevalence of diphtheria, Dr. Prior regrets that his efforts to secure isolation and disinfection were but moderately successful, and he fears a recurrence of the disease. In both districts there are signs of active sanitary work, but the water supply of Bedford must soon receive attention, for it is both defective in quality and quantity.

BUILTH RURAL.—Little of interest occurred in this district during 1882, but Mr. Herring has produced an excellent report upon the chief events of the year. Special reference is made to a solitary case of typhoid, which is instructive in showing the mischievous influence of sewer air. The patient was the daughter of a gardener who lived in a detached cottage in the garden. For some time past she had been out of health, but no decided symptoms were developed until April, when typhoid was diagnosed. The patient referred her illness to inhalation of bad air, and to the foul smell in the kitchen, especially in the early morning. Nothing wrong was discovered with the kitchen until, upon close inquiry and examination, it was found that there was a rat's run from under the room grate to the garden at the back of the house, and that this opened a direct communication between the privy cesspool and the kitchen. As the patient was in the habit of lighting the fire in the morning she was naturally in immediate contact with the escaping sewer gas which produced the typhoid symptoms. The privy was at once removed to some distance from the house, and no further complaints were made of foul smells. Considerable improvement was made in the sanitary condition of the district by the completion of a drainage scheme, and the provision of a supply of water to a couple of villages. The authority have approved the model of a combined ashpit and privy, designed by Mr. Herring, the details of which appeared in these columns some months since (see SANITARY RECORD, June 1882, p. 500). The general death-rate (17·60 per 1,000), was considerably augmented by the excessive number of deaths of infants, and by the fatality of diseases of the respiratory organs,

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CHELTENHAM.—Fortunately the past year was not characterised by any severe outbreak of zymotic disease at Cheltenham. Dr. Wright comments with satisfaction on the improvement which is being effected in house draining, and in the condition of cottage property. Numerous complaints were made of defective drainage, and an examination revealed the fact that many houses still retained the old brick drains with which they originally communicated with the public sewers. The decay of the bricks and the burrows of rats had together effected the ruin of most of these old structures, so that sewer gas found its way through various channels into many dwellings of all classes. In every instance Dr. Wright advised the removal of the old brick drains, substituting in their place hard glazed socket-pipes, well laid in concrete at a good gradient, having the joints carefully secured with clay and cement, with the outfall of the house-drain opening into an intercepting syphon. By this method 'a healthy house is secured to the occupant; in many cases the question of expense stopped the way, but so general has the demand become, that if owners of house property wish to retain their tenants they are obliged to yield to these demands, or find empty houses upon their hands.' It is satisfactory to note that in consequence of this advice the number of houses that have been effectually drained and ventilated is increasing monthly. The year saw the demolition of a considerable number of uninhabitable dwellings, and the starting of a company for the erection of cottages in their stead. To the principal zymotic diseases 53 deaths were referred out of a total of 796, equal to death-rates of 1·1 and 17·6 per 1,000 respectively.

CHESTER-LE-STREET RURAL (Harrington Division).—Mr. Jackson is to be congratulated upon the amount of general interest he has infused into his last report, especially in regard to the prevalence of infectious disease, but subsequent reports might well contain some further account of the sanitary condition of the district and of the steps taken towards its improvement. An unsatisfactory feature of the statistics is the large proportion of uncertified deaths, since no fewer than 66 out of a total of 422 are so returned. Referring to the subject, Mr. Jackson observes that the present mode of registering deaths is an indisputable sham and delusion. So long as registrars grant certificates for persons to receive money out of a friendly society upon the dicta of unqualified men, there can be no hope of keeping such persons in check, or of vital statistics ever being made perfect. While dealing with this question the health officer also draws attention to the large amount of incomplete vaccination which is performed by medical men, to whom the parents resort in preference to the public vaccinator. As compared with the previous year, the mortality from both lung and zymotic diseases shows an increase. There was one death recorded from typhus, of which disease several cases occurred in January; but the prompt measures taken by the health officer prevented any spread of the infection. During his inspections of the district Mr. Jackson noticed with regret the antipathy displayed by the people towards any interference with their gossiping habits or their household sanitary arrangements. Information as to infectious disease was moreover resolutely withheld. Prominent attention is drawn to these facts as showing under what adverse circumstances health officers have to grope about for information which ought to have reached them at a much earlier period, so that preventative measures could have been adopted under more favourable circumstances.

COVENTRY URBAN.—While Dr. Charles Fenton has the satisfaction of reporting that the death-rate of 1882 was so low as 18·3 per 1,000, he regrets to have to record a considerable increase in the rate of mortality amongst infants. During the past year 193 deaths occurred in children under twelve months of age—a number greatly in excess of what should be. Bronchitis and pneumonia and convulsions each accounted for 39, wasting diseases for 38, premature birth for 26, scrofula and tubercle for 21, and zymotic disease for 15 deaths. Injudicious feeding and exposure seem almost entirely responsible for the waste of infantile life which is constantly going on. Printed instructions as regards the management and dieting of infants, have been extensively circulated amongst mothers; and it is to be hoped that this measure may be productive of good results. The year was marked by a widespread epidemic of measles, which was fatal to 17 children. Scarlet fever, the remnant of the epidemic of the previous year, accounted for a similar number of deaths. The experience gained by Dr. Fenton during these and other outbreaks leads him to strongly recommend the compulsory notification of infectious disease, which he thinks is the only measure that can master them. Small-pox appeared in the district on three separate occasions, but the adoption of prompt measures prevented any fatal extension of the disease. The health officer speaks in high terms of the immense assistance rendered by the Infectious Hospital, which, however, seems in need of extension.

GATESHEAD.—The sanitary history of Gateshead during 1882 was unsatisfactory from many points of view. The year was one of extreme unhealthiness, and the death-rate, which rose to 23·03 per 1,000, was considerably augmented, by the fatality from typhus and small-pox. Epidemics of typhus possess more than local interest, and Mr. Green properly includes in his report a special account of the Gateshead outbreak. The disease, which was present during the last quarter of 1881, had almost disappeared at the beginning of 1882, when there were three cases in the town. Only one case was notified in February, but there were reports from the eastern district of feverish attacks and simple fevers amongst children, which were apparently mild cases of typhus. During the next month the disease suddenly appeared in every part of this district, attacking persons of all ages. In April the malady considerably abated in the eastern district, but only to break out elsewhere, and the last quarter of the year witnessed a sharp outbreak in the west district, though here compulsory removal of all the sufferers succeeded in quelling it by the close of the year. Overcrowding, which is generally found in association with typhus, was largely prevalent, with its attendant evil of household filthiness. Cases of actual starvation were not heard of, but there was a state, described by Mr. Green as artificial starvation, which was produced in an enormous number of cases by the expenditure of money in stimulants. Referring to the condition of many of the houses, notably those let in tenements, Mr. Green strongly advocates a house-to-house visitation. The total number of deaths recorded from typhus were 49, 23 happening in the hospital, which was again of striking value both in this epidemic and in the outbreak of small-pox. Of this last disorder there were altogether 275 cases notified, with 34 deaths, and an examination of the patients treated in the hospital showed, as usual, that the mortality was almost confined to the unprotected. To diarrhœa 99 deaths are attributed, 77 of which were children under five years of age.

GLOUCESTERSHIRE COMBINED DISTRICT.—The sanitary history of this immense area, which covers nearly 620 square miles, was fairly uneventful in 1882; but Dr. Bond has not failed to make excellent use of the materials at his disposal. No new works of importance were undertaken by any of the authorities in the district during the year; but Cirencester is to be supplied with water by a private company. The negotiations between the urban and rural authorities of Gloucester in regard to a joint scheme for joining the contiguous portions of the two districts in the neighbourhood of the Bristol Road still continue, and at the date of the report the matter was awaiting the result of an inquiry by the Local Government Board. Generally speaking, the prevention and removal of the common forms of nuisances have been satisfactorily carried out, but overcrowding is still rampant in some places. The [illegible] has been chiefly brought out by the congregation of large numbers of workmen engaged in constructing the Severn

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tunnel; and, with a view to successfully coping with it, application has been made to the Central Board for powers to make by-laws under section 90 of the Public Health Act in regard to houses let in lodgings. The general death-rate represented 16·0 per 1,000, against 14·3 in 1881, and 16·4, the mean of the last nine years. The increase is in a large measure due to a considerable augmentation in the mortality from the scarlatinoid group of diseases and from 'fever,' which prevailed extensively at Thornbury. The increased mortality of the year fell chiefly upon young children, 641 deaths under five years of age being registered in 1882, against 499 recorded in the previous year. Out of a total of 195 deaths from zymotic disease, scarlatina caused 62, diphtheria and croup 34, whooping-cough 29, measles 19, continued fever 22, and diarrhœa 21. Dr. Bond has much of interest to say in reference to the prevalence of these diseases, especially in regard to the concurrence of diphtheria and scarlatina, a question which seems to call for special investigation.

HOLME VALLEY.—This combination is composed of ten small urban districts, which, together, have an estimated population of 21,358 persons and an area of 19,736 acres. For health purposes the district is officered by Mr. Fowler Scougal, whose recent appointment accounts for the fact that his report deals only with the last four months of 1882. The prevalence of zymotic disease, and the circumstances found in connection therewith, are properly made the subject of special comment, while some account is also given of the sanitary condition of the district. In regard to the former, Mr. Scougal looks upon the compulsory notification of infectious disease as an absolute essential, if epidemics are at all to be successfully dealt with. As a rule, information of outbreaks of zymotic disease does not reach the health officer until they have existed for some time; indeed, during the short period—four months—of which the report treats, one epidemic had practically exhausted itself before it came to the knowledge of Mr. Scougal, when, of course, preventive measures were out of the question. Overcrowding is generally prevalent, and the great majority of the population are mill-workers, labourers, &c., whose houses, in the majority of cases, consist only of two rooms, one of which is used as a bedroom, with no fireplace or other means of ventilation. Many of the houses also are built with their backs against the soil, and are of necessity damp and devoid of any means of through ventilation. Mr. Scougal strongly advises his various authorities to refuse to sanction plans of premises built on the back-to-back principle, which is open to very grave objection. Privy accommodation is described as being sadly defective, and the drainage and the water supply as far from perfect. In dealing with these subjects, Mr. Scougal gives some excellent advice, which he finds difficult of enforcement, owing to the large number of separate authorities interested. During the last four months of the year there were 106 deaths registered, equal to an annual death-rate of 14·93 per 1,000.

KEIGHLEY URBAN.—The fact that so large a proportion of the present report is taken up with a statement of the measures taken towards securing a reduction in the present high rate of infantile mortality, doubtless accounts for the meagre account it contains of the sanitary work carried on during the year. The lamentable waste of infant life at Keighley has already been referred to in these columns (see SANITARY RECORD, May 1883, p. 516), so that the subject may now be passed over. The occurrence of several cases of lead poisoning led Mr. Roberts to issue a code of precautions, which he includes in his report. In houses where lead connections with the water mains exist, consumers are strongly advised to allow the water to run to waste every morning for a short period before using it for domestic purposes, while persons becoming occupants of houses empty for some time are urged to allow the water to run to waste for an hour. After many analyses, Mr. Roberts strongly recommends the use of charcoal filters, and he expresses his firm conviction that these will filter out all the lead. From all causes there were 567 deaths registered, and, deducting those not properly due to the borough, the death-rate would represent 21·4 per 1,000, the lowest ever recorded by Mr. Roberts since his appointment. Scarlet fever prevailed in a serious epidemic form and destroyed 27 lives—a mortality in some measure due to the gross carelessness displayed by parents. There were eight deaths from typhoid fever, but the report is silent as to the circumstances attending this fatality.

LEICESTER.—Like its predecessors, the last report from the pen of Dr. Johnston contains, in addition to an able review of the chief causes of death, &c., a series of tables setting out the ward distribution of the mortality, and two excellent tables showing the incidence of phthisis and of zymotic disease in certain localities. The report also contains an account of the sanitary work carried out, special mention being made of the completion of a systematic house-to-house visitation. An improvement of considerable importance was the closure of a large number of surface wells, which, from their position, could not fail to be sources of danger. During 1882, 233 samples of well-water were collected for analysis, and no fewer than 193 were condemned as unfit for use. The plan hitherto in force of the collection of samples without waiting for complaint has been productive of good results, and the unwholesome conditions disclosed thereby warrant its continuance. It would, as Dr. Johnston observes, be simply folly to await complaints, for, generally speaking, there is nothing in the appearance of polluted well-waters which would reveal to the unaided senses of the people the deleterious and highly dangerous quality of the water they are partaking of. The figures given in the report in support of his contention as to the advantages of compulsory notification of infectious cases have been much canvassed locally; and as Dr. Johnston will doubtless have a reply to make to his critics in his report for the current year, we suspend for the present any observations on this subject. Small-pox, which was fatal to five persons, appeared on several occasions, and the prompt measures taken for isolating the cases as they occurred played an all-important part in restricting the spread of disease, which might otherwise have assumed epidemic proportions. Diarrhœa accounted for 214 deaths, 117 of which were infants under one year, and measles for 74. Of the 722 reported cases of scarlet fever, with 72 deaths, but 430 were admitted to the hospital, leaving a residuum of infection in 292 houses scattered throughout the borough. The total deaths properly due to the borough were 2,530, representing a death-rate of 20·0 per 1,000, the lowest ever recorded.

MIDDLESEX AND HERTFORDSHIRE COMBINED DISTRICT.—A special feature of the reports on this combination is the cognisance which is taken of the progress of sanitary work, and the suggestions made for further improvement. Generally speaking, the sanitary condition of the district is satisfactory. Improvements of a lasting kind are being made in many parts, but there remain a vast number of cases where nuisances are removed only to recur. This applies more particularly to methods of excrement disposal—the foul privy, aggravated oftentimes by an overflow to a ditch, still being far more prevalent than it ought to be, when the simple alternative of a dry closet is so easy of application. A very grave defect exists in the newly-sewered town of Barnet, where the great majority of the closets are still without a proper water-supply, either to keep the closet fittings clean or to properly flush out the house drains. The system of sewerage in the East Barnet valley district is also defective, owing to insufficient velocity in the sewage flow. Several portions of the rural district of Watford, notably Rickmansworth, where the mean death-rate for the past five years has been as high as 19·7 per 1,000, are in a very unsanitary condition, and some parts of Hendon are in need of improvement, which, however, is shortly to be effected. A large proportion of the prefatory remarks to the individual reports is taken up

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with an appeal for the general provision of hospital accommodation. So far Dr. Saunders has been unable to impress upon the various sanitary bodies the great need that exists for infectious hospitals; a need which was amply demonstrated by the events of the past year. Among a population of 96,567 persons there were 1,500 deaths, giving a death-rate of 15·6 per 1,000. Zymotic diseases caused 10·3 per cent. of the whole mortality, and diseases of the respiratory organs, especially amongst children, were unusually fatal.

NEWTON ABBOT, DAWLISH, AND WOLBOROUGH.—After ten years' service Mr. Leonard Armstrong has resigned his position as health officer to these districts. A glance at the report before us shows that much good has been accomplished during this period, but it is to be regretted that, if only for the purposes of comparison, Mr. Armstrong has not included some general statement of the mortality, or at least the zymotic mortality, recorded in the three districts. At Newton Abbot the death-rate represented 15·4 per 1,000, which, although 1·4 higher than the remarkably low rate of 1881, was 2·3 below the mean rate of the eight previous years. In other words, while only 1 person in 71 and 65 of the population died in the years 1881 and 1882 respectively, the average annual mortality of previous years was nearly one in every 59 persons. The death-rate of Dawlish, after deducting the deaths of 14 visitors, represented nearly 16·0 per 1,000, a noticeable feature of this mortality being the excessive fatality amongst infants. At Wolborough also the death-rate was as low as 14·5 per 1,000, being identical with that reported for 1881; but here also the mortality amongst infants was excessive, 14 children out of every 100 born having died before they completed the first year of their existence. In the rural district the constant and persistent occurrence of throat complaints of a serious character led to some careful inquiries, with, unfortunately, but barren results. In the course of an inquiry into the source of a slight outbreak of scarlatina at Wolborough the health officer found that out of 16 families attacked 9 obtained their milk from one dairy where a case of the disease had occurred. No mention of this was made to the authority, and Mr. Armstrong observes that until the notification of cases of infectious disease is made compulsory the beginnings of such epidemics as this will continue to escape attention. Mr. Armstrong takes exception to the action of the Central Board in refusing to sanction an old code of by-laws, and in 'enforcing the adoption of the cumbrous models which are in favour at present,' and he adds that it is evident that local option, and the principle of local option, count for very little at the Local Government Board when they come into collision with the prescribed routine of centralised officialism.

NEW FOREST RURAL.—Mr. Jenkins congratulates his uthority upon the low rate of mortality in their district during 1882, which represented 14·61 per 1,000 against 16·8 in the previous year, and 16·6 in 1880; and assures them that the comparative absence of zymotic disorders has been due in some measure to their efforts to improve the water supply. Whooping-cough, measles, and scarlatina together accounted for nine deaths, chiefly amongst young children; while to lung disease and phthisis 60 deaths are referred—a mortality to which the inclement and wet weather of the past year must to some extent be held responsible. The sanitary condition of the district received attention, and Mr. Jenkins notes an extension of the drainage, and the abatement of nuisances incidental to a rural district.

PORT OF LIVERPOOL.—The task of systematically inspecting the vessels arriving at this port was successfully carried on during 1882 under the supervision of Dr. Stopford Taylor, who comments with satisfaction on the willingness of shipowners to comply with every suggestion for the sanitary improvement of their vessels and accommodation for the crews. In no single instance was it necessary to serve a notice or take legal proceedings, a fact which speaks well for the system adopted at Liverpool, since no fewer than 4,820 vessels were inspected during the year, 320 of which were found in need of improvement. In 182 the forecastles, peaks, and cabins required thoroughly cleansing, painting, and limewashing, and in some few instances refitting; in 64 were found faulty bulkheads, in 80 defective ventilation, in 7 the decks over the forecastles required caulking, and in 56 were faulty closets. A great improvement was noted in the condition of the small coasting sailing vessels, and their number is rapidly diminishing, being supplanted by steamers which do the work more expeditiously, and have much better accommodation for the crews. Fifty-eight ships arrived in the port with zymotic disease on board, and 197 emigrants, 174 of whom were suffering from measles, were admitted into the Brownlow Hill Hospital. Dr. Taylor refers to the mischief not unfrequently caused by the passage of an enormous number of emigrants through the city, a matter which has recently been the subject of investigation by Dr. Blaxall, of the Medical Department of the Local Government Board.

ROMFORD RURAL.—Dr. Wright points out very clearly the numerous conditions in this district calling for improvement; and for any inaction of the authority want of practical advice cannot be pleaded. At Ilford there is a very imperfect system of sewers, with which many houses are still unconnected. At Hornchurch there is no provision for drainage or scavenging, the privies and cesspools emptying into ditches and streams; and a similar state of things exists at Rainham. Improvements are, however, contemplated at Chadwell Heath, a rising locality, where houses of a good class are being extensively built, by the provision of a system of sewerage by water-carriage. The whole question of the disposal of sewage and of refuse in this district must sooner or later come up for permanent settlement, since the present imperfect methods are the source of constant complaint. Zymotic diseases were not prevalent in any severe form during the year, but a localised outbreak of small-pox, of which there were twenty-five cases and seven deaths, caused some anxiety. Typhoid fever prevailed in an isolated manner until November, when an epidemic of the disease commenced, reaching its height in January of 1883. Of scarlatina there was a considerable number of cases, nine proving fatal. The death-rate from zymotic disorders was equal to 2·06 per 1,000, and from all causes 17·4. Dr. Wright again urges the provision of an infectious hospital, which it is to be regretted the authority have not already provided.

ST. GERMANS RURAL.—This district has more than once been inspected by the staff of the Medical Department of the Local Government Board, and recently Dr. Ballard has been inquiring into the prevalence of fever at Millbrook. The death-rate from zymotic causes (3·5 per 1,000) may well have attracted the attention of the Central Board. The outbreak of fever at Millbrook commenced in May, and in all there were 25 cases in different parts of the village, though only 1 death was recorded. The epidemic was attributed to a polluted water-supply, while the fact that a dairy, situated in the same street as the well, supplied many of those attacked was naturally considered suspicious, and both were closed. The closing of this well rendered the supply of water inadequate for the wants of the people, and Mr. Kerswill properly advocates a fresh supply from an independent source, which would enable him to close a number of wells which are at present open to pollution. The same state of things exists at Torpoint, but here there is some promise of improvement. In other parts of the district progress is being made, but the authority have yet much to accomplish before their district can be considered in a thoroughly wholesome state. The appointment of Mr. Kerswill, who superseded the six officers who formerly supervised the union for health purposes, will doubtless assist in bringing this about. No statistical tables are appended to the report, which is published in a local newspaper. It is to be hoped that

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Mr. Kerswill may be able to persuade his authority to issue his subsequent reports in pamphlet form.

ST. MARYLEBONE.—In this important parish, described by Mr. Wynter Blyth as 'an area of unrest,' there were, making due allowance for non-residents, &c., 4,330 births and 3,237 deaths registered in 1882, representing rates of 27·8 and 20·8 per 1,000 respectively. With the exception of diphtheria, St. Marylebone was free from any extensive prevalence of zymotic disease. Scarlet fever, which was present in a severe form in an adjoining district, showed an increase in October and the early part of November, and then quickly declined. Altogether zymotic causes accounted for 450 deaths, the fatality closely following the law that wherever there are most children there is a greater zymotic fatality. Tubercular diseases were fatal to 351 persons, and in referring to this mortality Mr. Blyth observes that there is little doubt that consumption may be communicated from person to person, a view which he has consistently maintained. The remaining portion of the report is occupied with subjects of more or less general interest. A special and commendable feature, however, is the cognisance taken of the influence of drink in the causation of crime. During the year Mr. Blyth kept a record of the name, age, occupation, and address of every resident in the parish charged with crime, and, after some careful deductions, he shows that the direct influence of drink in producing it was about 25 per cent. The record of work performed in the analytical laboratory is, as usual, very complete.

STOCKTON RURAL.—But for the high death-rate amongst children, the mortality of this district for 1882 would have been very satisfactory. No fewer than 62, or more than one-third of the total number of deaths (178) were those of children who had not completed their fifth year, the largest mortality happening in the most densely-populated townships in the Union. Mr. Blandford reiterates his opinion that much of this deplorable waste of life is due to the improper manner in which children are clothed and fed, and he gives a few useful hints in this direction. Estimating the population at 10,749, the health officer returns the death-rate at 16·5 per 1,000, and the zymotic rate at 1·6. The sudden changes of the temperature and the prevalence of cold east winds during the second quarter considerably influenced the fatality from diseases of the respiratory organs, which were unusually prevalent. Measles of a very mild type prevailed in one portion of the district, where the action of school teachers in refusing admittance to children from infected houses played an important part in restricting the spread of the disease.

WILLITON RURAL (WESTERN DIVISION).—In his report on this district for the past year, Mr. Clark notes a peculiar relationship between a defective water supply and the number of applicants for medical relief. In referring to the subject he observes :—'With the knowledge I have gained from a personal examination of the different districts I have been able to clearly trace that more sick apply for relief from those places where the water supply is deficient or of bad quality.' In many of the villages the inhabitants are dependent for their supply from wells exposed to every kind of pollution, while in one case they have actually to resort to the watercourses that irrigate the fields. The mortality statistics present few points of interest. The death-rate was equal to 14·7 per 1,000, and zymotic diseases were fatal in four cases only.

SANITARY INSPECTORS' REPORTS.

CHEPSTOW RURAL.—Altogether Mr. Williams had to deal with 171 nuisances during 1882, 27 of which were abated without the issue of any formal notice. In nine dwelling-houses overcrowding was abated, in two dilapidations were repaired, and 39 were cleansed and disinfected. Nine new drains were provided, and a number of closets were built, repaired, or cleansed. Fifteen nuisances arose from offensive accumulations, 15 from the keeping of pigs, and five from foul ditches. In no case was it necessary to resort to legal proceedings.

CHIPPING SODBURY RURAL.—Out of a total of 202 nuisances which came to light during the past year no fewer than 90 arose from offensive refuse, while 20 were caused by pigs, and a like number by foul closets. No structural works were undertaken, but Mr. Adams reports that some minor improvements were effected by remedying defective closets and drains, and, in a few cases, by the provision of additional accommodation. Attention was directed to the parish pumps and wells, and three cases of overcrowding were abated.

CIRENCESTER RURAL AND URBAN.—Mr. Harmer reports that in three cases overcrowding was abated, that in four the water supply was improved, and that in 21 various defects were remedied. Seven new closets were built, and a considerable number were either repaired or cleansed. Of the other nuisances, of which there were 38, 22 arose from the keeping of pigs. At the close of the year 237 cases had been disposed of, leaving five under inspection. Beyond reporting that 43 houses were connected with the sewers, Mr. Williams has little of interest to record in the urban district. Out of 40 nuisances, 28 arose from defective privies.

DURSLEY RURAL.—But little of importance is noted by Mr. Robinson in his summary of work carried out in this district during 1882. A considerable number of nuisances were abated, and the inspector notes the provision of several new drains and closets, many of the existing ones being repaired and cleansed. In 84 instances the nuisances were abated without formal notice; in 78 the usual statutory forms were served; and in three it was found necessary to resort to legal proceedings.

EAST BARNET VALLEY URBAN.—During 1882 there were 122 plans passed by the Authority for the erection of new buildings, and to all those completed during the year special provision was made for a supply of water and for the fixing of ventilating pipes. Mr. Rumble reports that he inspected 90 private dwellings and schools, and visited the bakehouses, dairies, slaughter-houses, &c., situated in the district. Fifty notices were issued, presumably for the abatement of nuisances, but the inspector does not state with what result. Ten houses were whitewashed and cleansed, and a like number were disinfected.

EAST DEREHAM URBAN.—Considerable improvement was effected in the sanitary condition of this district during 1882 by the conversion of 95 privies into closets with a supply of water laid on from a public source. A number of dead wells were also abolished, and in referring to this, the inspector, Mr. Nankivell, observes that in three instances the dead wells belonging to the best class of houses in the town were within six feet of the well from which the water for domestic purposes was obtained. Reference is made to the method by which the sewage is treated, and to the success with which osiers and mangel are grown. The supply of water provided by the authority seems to be generally appreciated by the inhabitants, and during 1882 a number of premises were connected with the mains. The condition of several streets as regards surface drainage is unsatisfactory, and will soon call for active work on the part of the authority, who have deferred the question for pecuniary reasons.

GLOUCESTER RURAL.—No structural works were carried out in this district during 1882, and Mr. Weaver's report consists only of a summary of nuisances abated and of the performance of some routine work. Eighteen new drains and closets were provided, a number of houses were disinfected and whitewashed, and five cases of overcrowding were abated.

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HEMEL HEMPSTEAD RURAL.—Messrs. Flint and Banbury's reports refer to the completion of 729 sanitary works, but both suffer from their tabular form of arrangement. In regard to the drainage of the first district, the inspector states that 70 drains were cleansed and repaired, 25 were trapped, and 13 new sets were constructed. Water was laid on to 18 houses and 16 wells were covered and cleansed. A large number of houses were whitewashed and repaired, others were disinfected, and in nine minor improvements were effected. In both districts nuisances such as offensive accumulations, filthy ditches, the improper keeping of animals, &c., which are generally referred to in the reports of inspectors of rural districts, appear to have been satisfactorily disposed of.

HENDON RURAL.—The past year saw the completion of some extensive improvements in this district. At Pinner the main drainage works were completed, and at the close of 1882, 195 houses had been drained into the new sewers. The system of sewerage was further extended in Harrow, where 23 houses were connected with it. In his summary of routine work carried on, Mr. Woodbridge takes cognisance of the repairing and reconstructing of house drains, the erection of closets and privies, and the abatement of overcrowding. Forty-eight houses were supplied with water, 38 sewer ventilators were constructed, and 60 cesspools were emptied. The total number of nuisances, &c., dealt with during the year amounted to 805.

KEIGHLEY URBAN.—The alteration of 101 privies from the pit to the pail system is the most important improvement noted by Mr. Holmes in the report on this district for 1882. Ninety-nine nuisances were dealt with, but the inspector gives no account of their character, beyond remarking that 19 were of more serious import than the remaining 80. Legal proceedings were resorted to on three occasions, one of the offenders, a vendor of diseased meat, being convicted and sentenced to three months' imprisonment without the option of a fine.

THORNBURY RURAL.—During 1882 sanitary work was actively carried on in Thornbury, and Mr. Williams reports the abatement of nuisances in a variety of directions. The prevalence of scarlet fever and of continued fever in the district occupied a considerable portion of the inspector's time, and in connection with these outbreaks 91 houses were cleansed and disinfected. In eight cases a defective water-supply was improved; and to 27 houses water certificates were granted. Fourteen proceedings were taken under the by-laws, seven for allowing offensive deposits to remain on the roads, and six for slaughter-house offences. Out of 189 nuisances inspected 174 had been abated at the close of the year.

WATFORD URBAN.—Mr. Williams reports that during 1882, he found no fewer than 160 taps and 200 closets wasting water, an evil which is chiefly brought about by the intermittent system adopted at Watford. Fifty sink pipes were disconnected, 136 defective drains repaired, and 15 foul ashpits were cleansed. To 21 closets ventilation pipes were fixed, and to a number of others steps were taken for removing obstructions. Including visits to the health officer, 1,385 matters were dealt with during 1882, when 80 complaints were received and 192 notices issued.

WELWYN RURAL.—Sanitary work, such as falls within the scope of a sanitary inspector, was energetically carried on during 1882, and Mr. Pearce states that altogether 522 nuisances were abated. Fifty drains were either unstopped or trapped, and four new earth-closets were erected. Eleven houses were closed, but whether as unfit for human habitation the inspector does not say. Twenty-five were repaired, eight were disinfected after the existence of infectious disease, and 66 were whitewashed. Mr. Pearce also refers to the performance of other routine work, of which he gives statistics, but in future reports the inspector should leave himself space to comment on the works the completion of which he has to chronicle.

NEW INVENTIONS.

COX'S IMPROVED APPLIANCE FOR ATTACHMENT TO DOMESTIC GRATES.

MR. R. E. COX, architect, of High Holborn, has patented an invention for attachment to open fire-grates, to facilitate the burning more especially of anthracite coal or coke. Illustrations are appended of this arrangement, which adds another to the appliances for effectually burning the 'stone' commented on in an article on 'Anthracite Coal and Smoke Abatement' in the SANITARY RECORD of November 15. Ever since the introduction of the question of smoke abatement we have pointed out how valuable would be a simple apparatus that could be attached to existing grates to lessen the production of smoke. Although Mr. Cox's invention can hardly be said to touch that part of the subject which relates to bituminous coal, he has effected a valuable improvement for facilitating the burning of anthracite, and, what is of equal importance, of coke, at present almost a drug in the market so far as domestic grates are concerned. To briefly describe Mr. Cox's invention: he closes the grating of the fire-basket at the bottom by fixing sheets of iron upon it from the sides, leaving only a small opening in the centre. Under the grate he attaches another iron plate about, say, one inch from the bottom, covering the opening left in the centre by the side plates before mentioned, and to a great extent the side plates also. The oxygen that is required to promote combustion from this point has consequently to enter from each side of the centre and lowest plate, and has to pass along the narrow channels left between the lower and upper side plates to the opening left in the centre of the grating of the fire-basket. As these plates become quickly heated the air is delivered to the bottom of the fire at a high temperature, and from the confined area through which it has to pass produces almost an equivalent to a small blast furnace. Mr. Cox, however, does not rely upon these plates alone, and his aim has been to dispense with wood, paper, or other means for first igniting his coal. For this purpose he calls in the aid of gas. One burner is carried along the front of the grate in a line with the bottom bar, another is supplied at the back of the fire-basket, and another is placed under the bottom plate. In first making the fire all these are lighted simultaneously, and, what with the heat they produce on the coals themselves and the very high temperature at which the oxygen to promote combustion is delivered to the fuel, the fire is made with remarkable rapidity. When the fire has burnt up, there is no longer need of the gas, which can be turned off, and as the burners are shielded where necessary, to prevent ashes falling into them, they are not likely to become clogged. It will be understood by this description that the arrangement, though simple, is scientific. But there is no absolute necessity to use gas at all, for beyond facilitating the quick lighting of the fire, it is as we have shown not required afterwards, so that the absence of gas is no bar whatever to the utilisation of Mr. Cox's appliance. The writer has been at some pains to watch fires made by this invention, and has seen them burning in the most satisfactory manner hours after the gas has been turned off, which they are almost bound to do by the arrangement carried out. He has, however, taken the greater interest in the coke fire on account of the prejudice existing against it from its usual sulphurous smell, and he is enabled to report a most satisfactory solution of the question. Besides seeing a fire in a house of business in Holborn, where the appliance has been fixed, and where nothing but coke is used, a fire was lit in another house in a small sitting-room, especially for his examination. The door of the apartment was kept closed, and the windows shut, to give every opportunity for the detection of sulphurous fumes, but none were in the slightest degree apparent, although the room had been so closed for hours, and a bright and cheerful fire was burning. This achieve-

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ment alone is of the utmost importance, and the invention is susceptible of further development in connection with bituminous coal, and the consumption of, or non-production of smoke from it. The cost of applying this invention to a grate is comparatively unimportant. Illustrations, with the patentee's description, are appended.

FIG. 1.

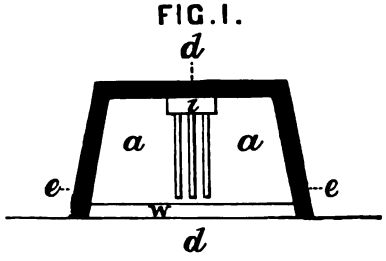


FIG. 2.

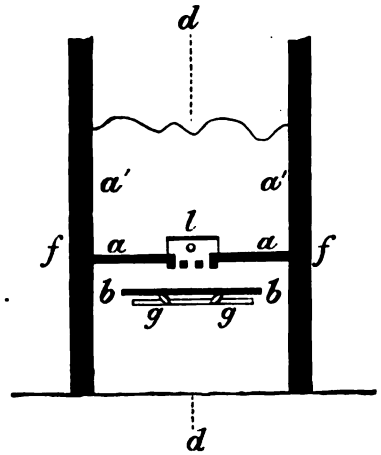
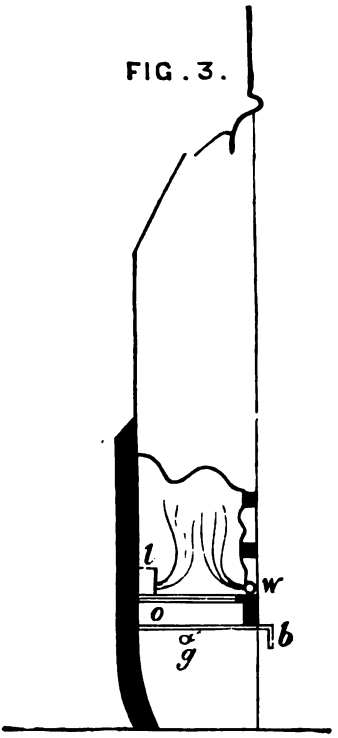


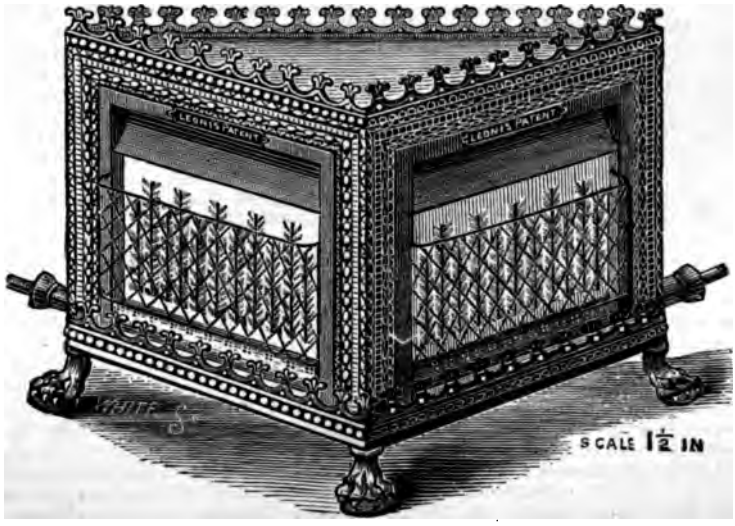
FIG. 3.



The drawings represent an ordinary register stove fitted with these improvements. Fig. 1 is a plan of the bottom grating, with side plates fixed. Fig. 2 is a section at EE. Fig. 3 is a section at DD. W is a horizontal perforated gas-pipe supplying gas for igniting the fuel at the front of the fire-place. L is a gas-burner protected by a shield by which gas is supplied to the back of the fire. AA are side plates placed on each side of the top of the bottom grating of the fire-place. O is the central opening between the plates AA. B is the bottom plate. GG are gas-jets below the bottom plate.

LEONI'S RADIANT INCANDESCENT GAS FIRES.

SINCE the introduction of these fires by Mr. Leoni at the Smoke Abatement Exhibition they have undergone considerable development under his hands. One of the most unique forms in which they have appeared is the one here illustrated, of triangular form, showing a fire at two angles from the front. It will be recollected that the heating surfaces consist of slabs of fire-clay, having vertical slits, into which are inserted a fringe of asbestos shavings, presenting a very pretty and cheerful appearance when alight.



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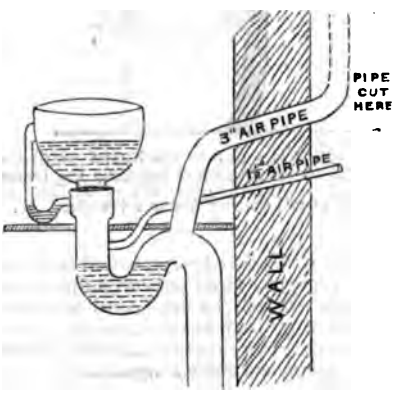
The burner (an atmospheric one) has a continuous 'slit' or opening from end to end, producing a solid flame its entire length. Although asbestos is said to be incombustible, in small particles such as are here used a certain amount of decay must take place in time from various causes, and one of the notable features of these fires are that the asbestos fringe can be easily renewed as occasion requires without trouble, from the simple manner in which it is arranged for use. It is fixed in copper clips of the required length for the slits in the fire-clay, and has only to be inserted in the openings, and the little tongues attached to the copper frame turned back against the slab of clay. These fires give out an intense heat, and the one in question is capable of heating a large room, while its novel form gives it a pleasing appearance.

CORRESPONDENCE.

[*All Communications must bear the signature of the writer, not necessarily for publication.*]

TRAP VENTILATION AND SYPHONAGE.

The following may be of interest:—A soil-pipe, about 12 feet long, had a pan closet at the top and was unventilated. The pan closet was removed and a Bramah put in its place, and at the same time a 3-inch air-pipe was taken from the top of the trap to the roof, some 40 or 50 feet above. The closet trunk was also ventilated by a 1½-inch pipe through the wall.



On using the closet a suspicious gurgling sound was heard in the trap, and the water was disconnected for an examination. The depth of water in the trap when full was about 5½ inches, but when the basin was filled to the overflow and suddenly emptied only 2½ inches of water remained in the trap. The 1½-inch air-pipe was then plugged, and this improved matters so far that 3½ inches of water were left. The long air-pipe was next cut away just outside the wall to get rid of the friction, and then with the small pipe open 4 inches remained, while with it plugged about 5 inches remained. It was tried frequently in each condition, and varied very slightly. Ultimately a 4-inch pipe was put in place of the 3-inch pipe, and proved sufficient to stop all syphoning.

It was evident that the small air-pipe from the trunk allowed the water from the basin to go down in a more solid mass, and so to be more effective in syphoning the trap. It seems therefore that, however desirable it may be to have an air-pipe from a closet trunk, such pipes must be used with caution wherever the ventilation of the trap is at all defective, or they may cause a worse evil than the one they are designed to cure.

GILBERT THOMSON.

Glasgow Sanitary Protection Association,
45 West Nile Street, Glasgow.

GERMAN STOVES *v.* ENGLISH FIREPLACES.

Will you kindly allow me some remarks about a report from your own correspondent, of the Swiss National Exhibition at Zurich. I have been struck with the passages concerning the stoves exhibited by Messrs. Bodmer & Baher, which seem to indicate that the principle by which heating is effected by tile stoves is not clearly understood. Your correspondent writes (SANITARY RECORD, Vol. iv., Part 48, p. 563), that on the bench, which runs round the stove, "a somewhat numerous family may sit in winter and keep their backs warm, *whatever may become of their faces and their feet.*' And again, speaking of two throne-like seats on each side of the main stove, 'that these will diffuse warmth all round the fortunate occupants, however much others may be left out in the cold.'

Now, it must not be forgotten that the heating of a room by our German stoves is effected in a manner quite different from the heating by open chimneys. In the latter the warmth is diffused by radiation only, so that those parts of the room or body only are warmed which are directly exposed to the radiation of the chimney fire. Quite the contrary takes place in a room warmed by a stove. There the heat is not given off directly as it is generated, but it is stored in the different chambers and passages of the stove and then gradually given off by the tiles to the air of the room. Thus, in a room heated by a tile stove the whole air space is equally and agreeably warmed; and whether you are quite near the stove or at the window, there will be but a slight difference. For example, if in my own medium-sized room the thermometer, put on a shelf, at a height of 1½ yard in the direct vicinity of the stove shows 63° F., it will show 60° F. (or 16° C.) on my writing desk, that has its place near the window (about six yards distant from the stove). It will be understood that, when the bench or seat near the stove is occupied by old or sickly people who generally want more heat, the other occupants of the room are not therefore left out in the cold, neither are our faces and feet in the same predicament if we turn our backs to the stove.

I am well aware of the predilection of the English for chimneys and open fires, and it is but natural that everybody should prefer what he has been accustomed to from his youth. But I daresay that just as an Englishman would miss the pleasant sight of the open flame, so would a German miss the agreeable warmth of a stove-heated room. I think a chimney fire a very pleasant thing for a person who has nothing to do but to sit before the fireplace and watch the fire; but what is to become of a numerous family of, say, six persons assembled in the common drawing-room, who, for their work (and the Germans are a very hard-working people) are in want of light as well as of warmth, and who accordingly must choose their seats as near the windows as possible.

To avoid misapprehension I may further mention that benches or seats round the stoves are only found in the family rooms of our peasants, who can never get heat enough, however much they have to expose themselves to the cold in the open air. In the towns of Southern Germany and Switzerland we have much smaller and more ornamental stoves than those shown at the Zurich Exhibition.

E. G. ALBRECHT.

Freiburg, Nov. 4, 1883.

THE SEWERAGE OF FRANKFORT ON THE MAIN.

In your issue of the 15th ult. you give a description by Dr. E. F. Willoughby of the measures proposed to be adopted by the authorities of the city of Frankfort on the Main in dealing with the sewage at the outfall of the general sewerage works commenced fifteen years ago. I do not know Dr. Willoughby, nor whether he is personally acquainted with the works in question, but I should almost imagine that he has obtained his information from the number of the *Vierteljahreschrift für Gesundheitspflege*,

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he quotes as containing the Report of the Prussian Commissioners, and he may therefore not be rable for the inference to be drawn from the introry part of his description which mentions Mr. ey's name only in connection with the works.

ere seems to be a persistency somewhere, and pro- it would not be difficult to divine where, to ignore me in connection with these works. A description m appeared in the *Builder* of Sept. 23, 1882, which made no mention of my name, and I would only o the letter to Mr. (now Sir Robert) Rawlinson, pt. 30, 1882, and to Mr. McKie's and my own of ', 1882, in the *Builder*, to show what an immense ce is endeavoured to be perpetrated whenever these are described at the present day in omitting my in connection therewith. As acting engineer I was ated with Mr. Lindley, Senior, at equal salaries, in ng out the works from their commencement in 1866 '3, and cannot therefore allow any article or reference m to pass unnoticed without correcting it in this t. I trust, therefore, to your fairness as a journalist e insertion of this protest against the omission of a in connection with works now so well known in the cal world; because it is not a matter of indifference rofessional man, who has spent the best years of his endeavouring to carry out what has been acknowby those who have seen them to be model works, e himself ignored in connection therewith, simply e they happen now to be in the charge of the son of ntleman originally associated with him.

ester, Dec. 3. J. GORDON, M.Inst.C.E.,
Borough Surveyor, Leicester.

AP SANITARY LITERATURE FOR THE PEOPLE.

I draw your attention to the cheap sanitary ire published by the National Health Society and ed for distribution after the popular lectures given Society's lecturers, by district visitors, mission , and others visiting amongst the poor,—leaflets on for health, Management of infants, Prevention of ead of fever, In a sick-room, What to do till the comes. Typhoid fever cheap disinfectants, and ry maxims are published by the Society, 44 Berners , and sold at 10s. 6d. per 1,000.

F. LANKESTER, Secretary.

SANITARY JOTTINGS.

SANITARY.

tary improvements of a very extensive nature are e progress at the Royal Naval Hospital, Stonehouse. hole of the water-closets and lavatories throughout uare block of ward buildings are being removed placed by new ones, embodying the latest scientific ements. The alterations are not confined to the closets themselves, but extend to the connections e sewer, new soil traps and an elaborate arrangef pipes being fitted to each closet and lavatory. In n, large vent pipes, several inches in diameter, are arried up the side of the buildings to carry off the gases forced up the sewer by the high spring tides, rendering it impossible for foul gas to escape into the wards. The whole of the work, which involves ay of about 2,500*l.*, is being carried out by men d under the superintendence of Mr. Richardson, f works, of the Director of Works Office, instead of t out by contract.

Green, the Medical Officer of Health for Gateshead, has suggested to the Sanitary Committee and the Corporation the propriety of making a house-to-house visitation such as is now going on in Newcastle, with a view of discovering and remedying any sanitary defects which may be in existence in those districts where disease has been most prevalent.

The Medical Officer of the Blaydon Local Board reports the prevalence of scarlet fever in that district. He instances one fatal case where he traced the origin of the infection, the parents of the child having recently attended the funeral of another child who had died of scarlatina at the neighbouring township of the Felling.

PARKS AND OPEN SPACES.

THE UTILISATION OF OLD BURIAL GROUNDS.—On the recommendation of the St. Pancras Works Committee, it has been decided to contribute a sum of 550*l.* towards the cost of laying out by the vestry of St. Pancras of the burial ground adjoining Holy Trinity Church.

THE Paddington Park Committee have come to the conclusion that in the present state of uncertainty as to the future government of London, they will suspend operations, although they do not abandon the cause. The Paddington Park Committee do not feel themselves competent to take any steps with reference to the site of the agricultural show at Willesden. It is outside the jurisdiction of the Metropolitan Board, too remote from the population which needs the preservation of the open space in Paddington to be available for them, and the money subscribed was for one site only. The committee will be ready to renew their labours whenever a fresh opportunity occurs of securing the ground.

THE most recent big thing in America is a public park of 3,573 acres in Wyoming.

THE vestry of Islington has unanimously adopted a report received from the churchwardens with reference to the laying out of the parish churchyard as a public recreation ground, pursuant to the provisions of the Metropolitan Open Spaces Act, 1881. The vestry has resolved to obtain an estimate of the cost of railing in and laying out the churchyard as proposed, and a faculty will also be applied for. The improvement will be carried out in conjunction with the widening of Upper Street, Islington.

THE corporation of Newcastle have agreed to apportion twenty-five acres of the Nuns' Moor for the purposes of a recreation ground.

CORRECTIONS.

In the list of awards to British exhibitors at the Amsterdam Exhibition, the name of Mr. Heap, of Manchester, as a recipient of a medal for his patent dry earth and ash closets was accidentally omitted. We are happy to rectify this omission in relation to an invention which has received the distinction of nine prize medals from sanitary exhibitions.

Dr. Strethill Wright, of Southport, asks us to state that the article 'Southport as a Health Resort,' published in the SANITARY RECORD of October 15, was incorrectly attributed to Dr. Arthur H. Wright, and also that the paper was printed from an uncorrected abstract.

EXHIBITIONS.

EXHIBITION OF GAS APPARATUS.

In January there will be held at Middelburg, in the Netherlands, an exhibition of machines connected with the use of gas as a heating agent and as a motive power. The exhibition is promoted by the committee of management of the gasworks at Middelburg, and it is stated that it will be the first of the kind ever held in the Netherlands.

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CONGRESSES.

SANITARY INSTITUTE OF GREAT BRITAIN.

An important meeting was held in Dublin on the 19th ult. to appoint the local officers and to consider the various arrangements to be made for the Congress to be held in that town by the Sanitary Institute in 1884. Sir John Lentaigne presided, and there was a large attendance of gentlemen representing the various leading societies in Dublin. A deputation from the Institute, consisting of Dr. Alfred Carpenter, chairman of the Council, Prof. W. H. Corfield, chairman of the Exhibition Committee, Mr. Ernest Turner, and Mr. E. White Wallis, secretary, attended the meeting to explain the objects of the Institute and the nature of the Congress and Exhibition held in connection with it. The deputation from the Institute visited the buildings proposed for the meetings of the Congress and Exhibition, and from the way that the preliminary arrangements have been made by the local committee, there is every prospect of a very successful Congress and Exhibition. Sir Robert Rawlinson, C.B., has accepted the presidentship of the Congress, which will open on October 14.

NOTICES OF MEETINGS.

DEPARTMENT OF HYGIENE AND PUBLIC HEALTH AT UNIVERSITY COLLEGE, LONDON.

A course of lectures will be given by Professor Corfield, M.A., M.D., Oxon, F.R.C.P., on Tuesday and Thursday, from 4 to 5 P.M. during the summer session, commencing in the first week in May. The object of this course is the study of the causes of diseases, and of the methods for their prevention. Especial attention will be paid to the requirements of medical officers of health, and of candidates for certificates in State medicine.

Part I.—Personal Hygiene: Age, sex, temperaments, idiosyncrasies, habits, hereditary tendencies. Foods and Drinks: Classification of food-substances, various classes of food, dietaries, preservation of food, adulterations, diseases produced by bad food. Drinking-water—qualities of, diseases spread by; alcoholic and non-alcoholic beverages. Epidemic and Endemic Diseases: Plague, cholera, yellow fever, typhus and enteric fevers, smallpox, scarlet fever, diphtheria, measles, whooping-cough; phthisis, scrofula, rickets, marsh diseases, rheumatism, and venereal diseases. Vaccination and Re-vaccination: History of; statistics relating to. Disinfectants: Various kinds of; methods of disinfection. Trades' Nuisances: Abatement of; inspection of workshops and factories. Vital Statistics: Principles of; calculation of death-rates; drawing up of reports, &c. Sanitary Law: Acts relating to public health; model by-laws; evidence in courts of law.

Part II.—Climate: Atmospheric influences, soil, geographical position, altitude. Air: General considerations, physical properties, chemical composition, sources of various impurities. Warming and Lighting: Materials used, effects on the air, apparatus of various kinds. Ventilation: Principles of, appliances used in natural and artificial ventilation. Water Supply: Sources of water, measurement of available supply, collection, distribution, intermittent and constant service, storage: purification. Drainage and Sewerage: Uses and construction of drains and sewers, flushing, ventilation, size and inclination of pipes, calculation of velocity. House Sanitation: Water-closets, sinks, baths, cisterns, dust-bins, disconnection of waste-pipes, trapping and ventilation of house-drains. Dry Earth and other conservancy systems, for the disposal of excretal refuse. Sewage: Composition of; treatment of by irrigation, filtration and precipitation. In addition to the ordinary prize medal, prizes to the value of 10*l.* or less, according to the number of candidates, will be given in this class: the qualification for competition being attendance at two-thirds of the lectures at least.

Practical instruction in the uses of sanitary appliances will be given in the Parkes Museum, Margaret Street, Regent Street, and inspections of sanitary works will be made by the class, under the direction of the professor.

Further particulars may be had of Professor Corfield, University College.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

The next meeting of this association will take place on the first Saturday in February 1884 when a resolution will be submitted, and a paper on Cremation, by Mr. Poulson, will be read. The Association of Public Sanitary Inspectors now numbers sixty-two members and sixteen honorary members. Intending members should apply for all information to Mr. Samuel C. Legg, 62 Gayhurst Road, Dalston, London, E.

APPOINTMENTS UNDER THE PUBLIC HEALTH ACT.

Medical Officers of Health.

Brown, John, L.R.C.P. Lond., L.S.A. Lond., has been re-appointed Medical Officer of Health for the Bacup Urban Sanitary District at £80 for one year.

Buckby. Robert Greville, L.R.C.P.Edin., L.R.C.S.Irel., L.M. Rot.Hosp.Dub., has been appointed Medical Officer of Health for the Basford Rural Sanitary District, Nottinghamshire, at £400 from year to year, *vice* Whitgreave, appointed to the Sheffield Urban Sanitary District.

Davidson, James H., M.B., C.M., has been appointed Medical Officer of Health for the Alnwick and Canongate Urban Sanitary District, Northumberland, at £30 per annum, *vice* Brown, resigned.

De 'Ath, Robert, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Buckingham Rural Sanitary District at £55, and for the Buckingham Urban Sanitary District at £15, for the year ending Dec. 25, 1884.

Fussell, Dr. Edward Francis (Medical Officer of Health for the combined Rural and Urban Sanitary Districts of East Sussex), has been appointed Medical Officer of Health for the Seaford Urban Sanitary District, at £20 per annum.

Istance, Richard, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Risca Urban Sanitary District, Monmouthshire, at £20 per annum, *vice* Robatham, deceased.

Johnson, Sydney, M.B.C.M.Univ.Aberd., has been re-appointed Medical Officer of Health for the Dalton-in-Furness Urban Sanitary District, at £50 for the year ending Dec. 31, 1884.

Kenyon, Dr. George Arthur, has been re-appointed Medical Officer of Health for the Birkenhead, Chester, Tarvin, and Wirral Rural Sanitary Districts, and the Bromborough, Chester, Higher Bebington, Lower Bebington, Neston and Parkgate, and Tarporley Urban Sanitary Districts, combined, at £635 per annum, for five years.

Millett, George Bown, L.R.C.P.Edin., M.R.C.S.Eng., L.S.A. Lond., has been re-appointed Medical officer of Health for the Penzance Urban Sanitary District, until Sept. 29 next, at £40 per annum.

Milne, Thomas, M.D.Univ.Aberd., has been re-appointed Medical Officer of Health for the Accrington Urban Sanitary District, at £80 per annum, for three years.

Pearson, Joseph, M.D.Edin., M.R.C.S.Eng., L.S.A Lond., has been re-appointed Medical Officer of Health for the Maryport Urban Sanitary District, at £25 per annum.

Rygate, Dr. Brougham Robert, has been appointed Medical Officer of Health for the Parish of St. George in the East, at £150 per annum, *vice* Dr. John James Rygate, resigned.

Shea, John, M.D., has been re-appointed Medical Officer of Health for the Reading Urban Sanitary District, at £300 per annum for three years, from 25th inst.

Watson, William Charles, L.R.C.P.Edin., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Hoole Urban Sanitary District, Cheshire, at £15 per annum, for three years.

Wright, Alfred, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Romford Urban Sanitary District, at £25 for one year.

Surveyors, Clerks to Guardians, Inspectors of Nuisances, &c.

Addison, Mr. George Aden Hadderton, Solicitor, has been appointed Clerk to the Kenilworth Local Board and Urban Sanitary Authority, at £50 per annum, *vice* Poole, resigned.

Bownass, Mr. Thomas, has been elected a Member of the Keswick Local Board and Urban Sanitary Authority, *vice* Walker.

Chapman, Mr. W., has been appointed Clerk and Collector to the Seaford Local Board and Urban Sanitary Authority, at £65 per annum.

Chappell, Mr. Richard, has been appointed Inspector of Nuisances for the Linton Rural Sanitary District, Cambridgeshire, at £60 for one year, *vice* Cattell.

Chapman, Mr. Manning, has been elected a Member of the Stowmarket Local Board and Urban Sanitary Authority.

Clark, Mr. W., has been elected a Member of the Newton Heath Local Board and Urban Sanitary Authority, *vice* Lockett, deceased.

Cox, Mr. Henry, has been appointed Inspector of Nuisances for the Seaford Urban Sanitary District, at £20 per annum.

Cumming, Mr. Robert Charles, of the Stafford branch of the Manchester and Liverpool District Banking Company, has been appointed Treasurer to the Corporation and Urban Sanitary Authority of Stafford, *vice* Wood, resigned.

Edwards, Mr. Trevor C., has been appointed Town Clerk and Solicitor, and Clerk to the Urban Sanitary Authority and Burial Board, Dewsbury, at £400 per annum, *vice* Smith, resigned.

Elliott, Mr. John Matthews, has been elected Chairman of the Newton Heath Local Board and Urban Sanitary Authority, *vice* Lockett, deceased.

Foster, Mr. William, Lecturer on Chemistry at the Middlesex Hospital, has been re-appointed Public Analyst for the borough of Monmouth at 4*l.* 4*s.* and fees, for one year.

France, Mr. James, Bank Manager, has been appointed Treasurer to the Saddleworth Guardians and Rural Sanitary Authority, Yorkshire, vice Kershaw, deceased.

Greenwood, Mr. Joseph, has been re-appointed Surveyor and Inspector of Nuisances for the Ulverstone Rural Sanitary District at £150 per annum, for three years.

Grice, Mr. William, has been re-appointed Inspector of Nuisances for the Hoole Urban Sanitary District, Cheshire, at £20 per annum for three years.

Harper, Mr. Charles, has been appointed Treasurer to the Cannock Local Board and Urban Sanitary Authority, and to the Cannock Guardians and Rural Sanitary Authority, *vice* Broadbent, resigned.

Hill, Alfred Bostock, M.D., L.R.C.P. Edin., has been re-appointed Public Analyist for the Borough of Royal Leamington Spa, for one year.

Leaker, Mr. W. C., has been appointed Treasurer to the Street Local Board and Urban Sanitary Authority, Somersetshire *vice* Roach, resigned.

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MUNDAY, Mr. R. W., has been re-appointed Inspector of Nuisances for the Buckingham Rural Sanitary District, at £45 for the year ending Dec. 25, 1884.

ORGAN, Mr. William Upton, has been appointed Surveyor, Inspector of Nuisances, and Collector, to the Corporation and Urban Sanitary Authority of Chepping-Wycombe, at £200 per annum, *vice* Buckham.

PEACOCK, Mr. Ralph, has been elected a Member of the Goole Local Board and Urban Sanitary Authority, *vice* Seed, removed from the district.

PITCHFORTH, Mr. Abraham, has been appointed Inspector of Nuisances for the Risbridge Rural Sanitary District, at £84 for one year, *vice* Cattell, whose appointment has expired.

POTTER, Mr. William, jun., has been appointed Collector to the Hornsey Local Board and Urban Sanitary Authority, at 2 per cent. commission, *vice* Barnes, resigned.

PROCTER, Mr. Thomas, has been re-appointed Inspector of Nuisances for the Dalton-in-Furness Urban Sanitary District, Lancashire, at £50 for the year ending Dec. 31, 1884.

READ, Mr. W., has been elected a Member of the Heath Town Local Board and Urban Sanitary Authority, Staffordshire, *vice* Marriott, resigned.

REDMAN, Mr. James, has been re-appointed Inspector of Nuisances for the Haworth Urban Sanitary District, Yorkshire.

REDWOOD, Theophilus, Ph.D., F.C.S., has been re-appointed Public Analyst for the County of Middlesex for one year.

SALTHOUSE, Mr. John, has been appointed Inspector of Nuisances for the Ulverstone Rural Sanitary District, at £70 for one year, *vice* Dickinson, appointed to the Saffron Walden Rural and Urban Sanitary Districts.

SHAKESPEARE, Mr. William, Solicitor, has been appointed Clerk to the Oldbury Local Board and Urban Sanitary Authority, at £200 per annum, *vice* Wright, resigned.

STANLEY, Mr. P., has been elected a Member of the Ilkeston Local Board and Urban Sanitary Authority, Derbyshire, *vice* Wilson, resigned.

STEVENSON, Thomas M.D.Univ.Lond., F.R.C.P.Lond., has been re-appointed Public Analyst for the Borough of Godalming, for one year.

THOMPSON, Mr. Frederic William, has been elected a Member of the Midgley Local Board and Urban Sanitary Authority, Yorkshire, *vice* Mitchell, disqualified by non-attendance for six months.

WARD, Mr. F., has been elected a Member of the New Sleaford Local Board and Urban Sanitary Authority, Lincolnshire, *vice* Goldie, resigned.

WATERHOUSE, Mr. James Dean, Manager of the Ashton, Stalybridge, Hyde, and Glossop Bank, Ashton-under-Lyne, has been appointed Treasurer to the Corporation and Urban Sanitary Authority, and to the Guardians and Rural Sanitary Authority of Ashton-under-Lyne, *vice* Coulthart, resigned.

WHITLEY, Mr. John R., has been appointed Clerk, Collector, and Accountant to the Haworth Local Board and Urban Sanitary Authority, Yorkshire, at £75 per annum, *vice* Redman.

WILKINSON, Mr. A., has been elected a Member of the Lowestoft Board of Improvement Commissioners and Urban Sanitary Authority, *vice* Thirtle.

YOUNG, Mr. W. C., has been appointed Public Analyst for the Parish of St. George in the East, at £100 per annum, *vice* Rygate, resigned.

VACANCIES.

MEDICAL OFFICER OF HEALTH for the Salisbury Urban Sanitary District.

MEDICAL OFFICER OF HEALTH for the Thorne Rural Sanitary District, Yorkshire; £70 per annum.

MEDICAL OFFICER OF HEALTH for the Dawlish and Wolborough Urban Sanitary Districts and the Newton Abbot Rural Sanitary District, combined, at £350 per annum, till Michaelmas 1886. Application, December 18, to Joseph Alsop, Newton Abbot.

MEDICAL OFFICER OF HEALTH for the Billesden, Blaby, Hinckley, Lutterworth, Market Bosworth, Oakham, and Uppingham Rural Sanitary Districts and the Melton Mowbray Urban Sanitary District, combined.

CLERK to the Luton Guardians and Rural Sanitary Authority, Bedfordshire.

CLERK to the St. George Local Board and Urban Sanitary Authority, Gloucestershire.

SURVEYOR to the Corporation and Urban Sanitary Authority of Chorley.

SURVEYOR to the Sandown Local Board and Urban Sanitary Authority.

LOCAL INTELLIGENCE.

OXFORD LOCAL BOARD AND URBAN SANITARY AUTHORITY.—The following have been elected new members—viz., Messrs. A. H. D. Acland, A. Savage, C. Underhill, R. Thomas, J. Calcutt, F. Ryman Hall, — Simmonds, E. L. Elliott, and Christopher Ridley. The election of the last named was invalid owing to an informality; but he has since been elected by the Board.

MANSFIELD IMPROVEMENT COMMISSIONERS AND URBAN SANITARY AUTHORITY.—The following have been elected new Commissioners:—James Maude, Douglas John Patterson, Thomas Hartas, Edward Cuddy, Samuel Ward, John Edwin Birks, Wm. Golland Crowther.

At the fortnightly meeting of the Workington Local Board and Urban Sanitary Authority, held on Thursday, November 8, the following resolution, moved by the chairman and seconded by Mr. Whitfield, was carried unanimously: 'That this Board expresses its unfeigned regret and deep sorrow at the untimely death of the late medical officer, Dr. Hogg, and asks the clerk to prepare a letter of condolence to the bereaved family with reference to this sad event.' The chairman, in his speech, after some eulogistic remarks upon the deceased gentleman, as a medical man, spoke of him more particularly as a medical officer of health in the following words:—'As a medical officer of health he was alive to those important duties appertaining to his office, paying great attention to those sanitary measures which are so essentially requisite for conducing to the health of the district, and where a district is so rapidly extending as our district is. Those duties were sometimes very arduous, and they required a great amount of care and attention, which was readily given them by our deceased officer in a firm but not overbearing manner. On many occasions he had unpleasant measures to carry out, but from these he did not shrink, his motto being, "Do what is right."'

The enactment contained in the 90th Section of the Public Health Act, as to houses let in lodgings, has been declared by the Local Government Board to be in force within the Borough and Urban Sanitary district of Carnarvon.

Mrs. John Elder has purchased thirty-five acres of land, at a cost of 37,500*l.*, for a public park at Govan.

The Local Board and Urban Sanitary Authority of Chatham have given notice of their intention to apply to the Board of Trade for a provisional order to authorise them to reconstruct the Sun Pier.

Mr. Henry Northover Pink has obtained a superannuation allowance of 112*l.* 10*s.* per annum upon resigning as medical officer of health for the Greenwich district, after nearly twenty-eight years service.

The Greenwich District Board of Works, upon the resignation of Mr. Henry Northover Pink as medical officer of health, have decided to divide the district into two, and to appoint one for the Greenwich division, at 100*l.* per annum, and one for the Deptford division, at 150*l.* per annum.

The Woodford Local Board and Urban Sanitary Authority have increased the salary of Mr. W. Holloway, the inspector of nuisances, from £100 to £150 per annum.

The Kenilworth Local Board and Urban Sanitary Authority have unanimously voted £50 to Mr. William Savage Poole, upon his resigning as clerk, in recognition of his general and professional services for six years.

The Rawtenstall Local Board district has been extended, and has now a larger area than any other. The following have been elected additional members, viz.:—Newchurch Ward: Robert Ashworth, Joseph Haworth, William Lord, James Nuttall, A. J. Harrison, James Hill. Higher Booths Ward: George Duckworth, James E. Holt, R. Sharples, J. R. Ramsbottom, Richard Hargreaves, W. Whitehead. Central Ward: Edwin Oddie, J. O. Whitehead, Henry Harwood, J. Noble, George Taylor, J. Ashworth, jun.

The West Bromwich Town Council and Urban Sanitary Authority have, upon the recommendation of the Sanitary Committee, voted £70 to Mr. John Manley, the medical officer of health, for services rendered in stamping out the small-pox epidemic.

Mr. Carew Davies Gilbert, the lord of the manor, has signified his intention of presenting two silver maces to the Corporation and Urban Sanitary Authority of Eastbourne.

It is proposed to divide the Taunton Rural Sanitary district, and to appoint two inspectors of nuisances instead of one, as at present.

Mr. W. H. Nankivell was re-appointed surveyor to the East Dereham Local Board and Urban Sanitary Authority, at the reduced salary of £25 for one year (see page 96), which he declined to accept; but the Board having, upon reconsideration, reverted to the former salary of £50, Mr. Nankivell continues.

There were about 160 applicants for the office of Assistant Surveyor to the Corporation and Urban Sanitary Authority of Doncaster, at £150 per annum.

At the last meeting of the Rawtenstall Local Board and Urban Sanitary Authority, it was decided, by a large majority, to alter the name to Rossendale, consequent upon the enlargement of the district.

The Thorne Guardians and Rural Sanitary Authority, Yorkshire, having, a short time since, received a letter from the Local Government Board, deprecating the continued appointment of the Poor-law district medical officers, as medical officers of health, and urging the appointment of one medical officer of health for the whole district, discussed the subject fully at a meeting on the 5th inst., and passed a resolution to appoint one, as suggested, at 70*l.* per annum.

INTERNATIONAL HEALTH EXHIBITION, 1884.

REGULATIONS.

THE Exhibition will be opened on Thursday, May 1, and will continue open for a period of not less than six months. The principal objects to be exhibited are comprised in the accompanying classification, which is intended to illustrate chiefly food, dress, the dwelling, the school, and the workshop, as affecting the conditions of healthful life, and also the most recent appliances for elementary school teaching and instruction in applied science, art, and handicrafts. Medals in gold, silver, and bronze, and diplomas of honour will be awarded on the recommendation of International Juries. No charge will be made for space, but exhibitors will have to pay every expense of transit, delivery, fixing and removing their exhibits, and erection of counters when required, and they must, either personally or by their agents, superintend the dispatch, transmission, reception, unpacking, and installation, and at the close of the Exhibition the removal of their goods; in default thereof the Executive Council reserves to itself the right of doing whatever may be considered necessary, and at the expense of the exhibitor. Should any goods be deposited in the Exhibition premises during the absence of the exhibitor or his agent, the

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Executive Council will not be responsible for any loss or damage, from whatsoever cause arising. Applications for allotment of space must be made on printed forms, which will be supplied on application to the Secretary, International Health Exhibition, South Kensington, S.W., which must be filled up and returned on or before February 1, 1884. After this date no application will be received. The nature of the articles which it is proposed to exhibit must be fully specified in the form of application for space. The applications will be laid before the Council, and the Secretary will, as soon as practicable, notify to applicants their decision with regard to the amount of space, if any, allotted to them. The Council reserve to themselves the absolute right of refusing to admit any exhibit. The Foreign and Colonial Commissioners appointed by their Governments are invited to communicate with the Secretary. They will be charged with the consideration of all questions relative to the distribution of the space allotted to their respective countries, and the Executive Council will place at their disposal all information and plans that may be useful to them. The applicants for space from countries in which no commissioner has been appointed will correspond directly with the Secretary. The Executive Council will endeavour to obtain, from the various English railway companies, special terms for the conveyance of exhibits to and from the Exhibition, and should they succeed in doing so, such arrangements will be communicated to intending exhibitors. All packages containing goods intended for exhibition must have painted on them the distinctive mark I. H. E., together with the *name and address* of the exhibitor. Labels will also be forwarded to each exhibitor. Packages from foreign countries must likewise have painted on them the letters I. H. E. They must all be marked in such a way as to show distinctly from whence they come, the name of the country, and of the exhibitor. All cases, counters, platforms, &c., must not exceed the following dimensions, without special permission:—Show cases and partitions, to feet above the floor; counters, 3 feet; platforms, 1 foot. Exhibitors may place railings around their stands, subject to approval; but in every instance the railings must be within the area of the 'stand,' *i.e.* the space allotted. The flooring must not be altered, removed, or strengthened for the convenience of arrangement, except by the sanction of the Executive Council, and at the expense of the exhibitor. No exhibitor will be permitted to display exhibits in such a manner as to obstruct the light or impede the view along the open spaces, or to occasion inconvenience, injury, or otherwise disadvantageously affect the display of other exhibitors. In order to insure uniformity of decoration and general good effect, no exhibitor will be allowed to put up any flags, banners, or other kinds of decoration without special permission. Signs or name-boards must be placed parallel with the main passages, that is, parallel with the frontage of the respective stands. These must be black with gold letters, and must be hung subject to the approval of the Council. All handbills, printed matter, &c., connected with the exhibits for gratuitous distribution, must first receive the approval and permission of the Executive Council, which permission may be withdrawn at any time. Cases must be unpacked as fast as possible, and the empty cases taken away by the exhibitors or their agents. The Executive Council decline to accept any responsibility with reference to empty cases, which must be at once removed from the building at the expense of exhibitors. Exhibitors will be required to provide all necessary attendance and to keep their stands and exhibits properly cleaned and in good order during the whole period of the Exhibition. No exhibitor will be allowed to transfer any allotment, or to allow any other than his own duly admitted exhibits to be placed thereon, except by permission of the Executive Council. All goods exhibited must be in the name of the person who signed the application form. Exhibitors are requested to mark the selling price of the articles exhibited, so as to facilitate the judgment of the jury, as well as for the information of visitors. Objects cannot be taken away before the close of the Exhibition, without the special permission in writing of the Executive Council. Special arrangements will be made with regard to perishable exhibits. As refreshments come within the scope and classification of this Exhibition, all methods of preparing the same, whether by cookery or otherwise, and the display and sale thereof, will be matters of separate arrangement with those wishing to be represented in this section of the Exhibition. Exhibitors of apparatus requiring the use of water, gas, or steam, are requested to make application to the Secretary for a special form, which has been prepared for this section of the Exhibition. All stoves, grates, &c., must be arranged with a view to the abatement of smoke. All fulminating and explosive substances and all dangerous substances are absolutely forbidden to be sent. Spirits, alcohol, oils, essences, corrosive substances, and generally all substances which might spoil other articles or inconvenience the public, can only be received in solid and suitable vessels of small size. The Executive Council reserves the sole right of compiling a catalogue of the exhibits under regulations which will be duly notified. Each nation will, however, have the right to produce at its own expense a catalogue of all the objects in its own section. The Council reserve to themselves the right of causing any of the exhibits to be examined, tested, or analysed for such use as they may think fit. No article exhibited may be photographed, drawn, copied, or reproduced, in any manner whatsoever, without the special sanction of the exhibitor and of the Executive Council. The Executive Council will not hold itself responsible for loss or damage occurring to any exhibit from any cause whatsoever; but, while declining any responsibility, it is the intention of the Council to take such precautions as it deems necessary. No goods can be sent in previous to March 15 without special permission; after April 15 no goods will be received. The right to add to, alter, amend, or expunge any of these rules is reserved by the Executive Council. Both Englishmen and foreigners in becoming exhibitors declare by so doing their compliance with the whole of these regulations, together with such other regulations as the Executive Council may issue from time to time. The Executive Council reserves the right to remove the objects belonging to any exhibitor who may not conform to the regulations. If any damage or injury shall be caused or occasioned during the Exhibition by any exhibited machine, implement, or article to any visitor or other person, or to any officer, servant, or others then and there employed by the Executive Council of the International Health Exhibition, 1884, then the exhibitor to whom such machinery, implement, or article may belong shall indemnify and hold harmless the said Council from and against all actions, suits, expenses and claims on account or in respect of any such damage or injury which may be caused or occasioned.

NOTES AND QUERIES.

Having for some time back been in the receipt of Queries appertaining strictly to sanitary work, and which it would be easy to answer, without having to refer our correspondent to competent professional advisers, we have opened a column in which to register such Queries and Replies thereto as can fairly be expected from us; and our subscribers and readers are invited to make such use of this column as will tend to benefit themselves and the community. Both Queries and Replies will, however, be subjected, if unnecessarily long, to a strict curtailment.

110. Objections to Cesspools.

I find the system of excrement disposal by means of cesspools very common in my district. I am anxious to abolish these as much as possible. Will you kindly inform me of the objections to cesspools, the precautions to be taken in their construction, and the law on the subject? Inspector.

[Cesspools were in days gone by a very favourite method of excrement disposal, and most old country houses and town mansions have been found to be honeycombed with them. They are not permissible except in the case of isolated houses or groups of houses where the provision of sewers is impracticable, or where there is no sewer within the statutory distance of 100 feet. (See sections 23 and 25 of the Public Health Act.) They necessarily involve the storage in proximity to dwellings of large accumulations of excremental filth, and hence they are liable to become a source of nuisance and of danger to health. They should be constructed of good brickwork in cement, properly rendered inside with cement, and with a backing of at least nine inches of well-puddled clay round and beneath the brickwork. The cesspool must be arched or otherwise covered over, and be properly ventilated and cut off from direct connection with the house-drains. The object of these precautions is to prevent the escape of either the gaseous or liquid contents of cesspools, as to which it is to be noticed that Section 47 of the Public Health Act makes punishable by a fine of 40*s.*, and 5*s.* a day, the allowing the contents of any water-closet, privy, or cesspool in an urban district to overflow or soak therefrom. Cesspools should not be allowed within 50 feet of a dwelling-house, and some 60 or 80 feet from any well, spring, or stream of water used for drinking purposes. They should be so constructed as to afford ready access for purposes of cleansing and removal of contents, and they ought not—for the reasons already indicated—to have, by drain or otherwise, any outlet into or means of communication with any sewer. For further details, see Sanitary Record for Nov. 1883, p. 247.]

111. Paving.

What steps can successfully be taken to compel a Local Board to put a proper footpath along a street? C. S. R.

[It is not easy to make the Local Board do their duty. Application may be made to the Queen's Bench for a *mandamus*, or to the Local Government Board under Section 299 of the Public Health Act, 1875; but in either case, if the Local Board say they are considering how best to do the necessary work, the application would probably be held to be premature. If damage has been sustained in consequence of neglect to repair a highway an action might lie. You had better consult a solicitor if the inconvenience it serious; if it is only slight, press your case at the time of the election of members next March.—Ed.]

112. The Disposal of Carcases.

A dead pig and a dead sheep are found upon a butcher's premises—viz., in his field in a rural district adjoining dwelling-houses, and is asked by his neighbours to remove them. Instead of the butcher burying or otherwise disposing of them, he or his servants throw them into an open ditch behind some houses. On the neighbours seeing this they apply to me as inspector of nuisances. I, as inspector, &c., serve the butcher with a notice under the 'Public Health Act,' 1875, to bury or otherwise dispose of the dead animals within twenty-four hours. At the expiration of that time I visit the premises and find the carcases in the ditch very much decomposed. The question is, what am I justified in doing, as my Board does not meet for thirteen days? An Inspector.

[For the future get a general authority from the Guardians to act in their name, in all cases requiring prompt action. You then could apply for a summons and get the case heard in a few days. In case of articles of food the quickest way of proceeding is to seize them under Sect. 116 of the Public Health Act and get them condemned by a magistrate, and leave the person on whose premises they were to object afterwards that they were not intended for food. There is no need to wait for a summons, and the magistrate can order the article seized to be destroyed at once, without waiting for petty sessions.—Ed.]

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ORIGINAL PAPERS.

THE ARTISANS' DWELLINGS ACTS, AND SUGGESTIONS FOR THEIR IMPROVEMENT.*

By JOHN W. TRIPE, M.D.,

Medical Officer of Health and Food Analyst, Hackney;
Late President of the Society of Medical Officers of Health.

SINCE I handed in the title of this short paper to the secretaries there have been so many articles written and speeches made on this subject that my suggestions must be somewhat flat and unprofitable, except that they will, I trust, lead to a useful discussion and expression of opinion by this society. As it is a subject which, in one respect, belongs almost exclusively to medical officers of health, it is, in my opinion, the duty of this society to state the results of their experience, and thus assist in directing public opinion in the most practical manner. I am glad to see that the part played by the inhabitants of insanitary houses in the causation of nuisances has lately received some attention, as too much blame was at first cast upon the landlords of the houses and too little on the inhabitants themselves.

The duty of setting in motion the local authorities who have power to require the amendment, repair, or demolition of houses which are unfit for human habitation devolves upon the medical officer of health for the parish or district. It might, therefore, be considered that I should treat of the conditions under which he is required to make an 'official representation;' but I do not propose discussing the various sections of these Acts, except so far as in my opinion they are defective and require amendment. The Acts taken as a whole are, I think, objectionable *in limine*, because in London they cast the duty of carrying out the provisions on two different local authorities—viz., the Metropolitan Board of Works, who, at the expense of the whole of London, have to pull down the houses in unhealthy areas of large size; and the Vestries and District Boards, who are required to do the same things as regards small areas, and at the expense of the parochial rates. Surely it would be better for this work to be done by one body, when it was necessary not merely to repair or alter but to pull down buildings, and the expense to be defrayed from one source than for the present arrangements to be continued. As to the body to carry out this work I express no opinion; but it is certain that if the work is to be effectually done great alterations must be made in the machinery for working the Acts, as well as in the cost, which to a great extent at present stops the way. It is indeed scarcely seemly that the state of the law should be such as to allow of a representation from a medical officer of health, to the effect that certain houses are unhealthy, and require amendment or pulling down, being thrown as a shuttlecock from one board to another.

As the earnings of the inhabitants of these dwellings is a material consideration in the matter, I propose discussing it in connection with the pecuniary position of the people, as different provision must be made for those earning, say, 24*s.* per week, and for those receiving less than 15*s.* a week. The dwellings erected in the place of those pulled down are occupied on an average by those who earn about 24*s.* a week, and who pay an average of 4*s.* 4*d.* per week for each holding. This amount is evidently far too much for the very poor who earn less than 15*s.* per week, and may be termed the substratum, and it is for these that homes have to be found. In addition to these, costermongers and others who gain their livelihood by vending articles of food, &c., cannot live in these dwellings because no provision is made for their donkeys and barrows. There are also some who will not submit to any restraint, and who consequently will not live in the Peabody and other similar dwellings; others, again, who are so filthy and destructive in their habits that they will not be received into them, or are speedily ejected. These classes have removed to adjacent buildings, increasing the overcrowding, or to a distance, where in some cases they have become more cleanly in their habits; but the very poor must live near to their work, and can often afford to pay only 2*s.* a week rent, or even less, and therefore frequently occupy only part of a room. Landlords are often blamed unfairly for the condition of the rooms occupied by these people, whilst, on the other hand, they very frequently charge a high rate for wretched accommodation. Still, the cost of keeping these tenements in proper order is so great, and the non-payment of rent so frequent, that a larger sum must often be charged than the rooms are worth. Under any circumstances something must be done to remedy these evils, and it has been suggested that amongst them is to reprove the habits of the poor by good counsel, and frequent visits of the kindly disposed. This is no part of the duty of a medical officer of health, who, however, should use his authority to have dilapidated premises repaired, the whitewash brush frequently and regularly used, and overcrowding as far as possible abated. This latter is not easily done, as it is somewhat difficult to ascertain the number of persons occupying a dwelling, except by visits at night, and because, as the law now stands, considerable trouble and much loss of time are involved in the removal of those who cause the overcrowding, either by letting a single room to persons having large families, or by the occupier underletting part of his holding, which may be only a single room. This is one of the matters which require special attention. I would propose that a landlord might be enabled to obtain an order from a magistrate for the speedy eviction of a tenant on the certificate of a medical officer of health, corroborated by his own oath, that a room or house was unfit for human habitation in consequence either of its dirty or dilapidated condition, defective structure, or from overcrowding. If this were the law, and a landlord did not take advantage of these powers, there would then be but little sympathy with him when he suffered from the penalties for allowing his tenants to occupy uninhabitable dwellings or even rooms.

Uninhabitable dwellings may be divided into two classes: viz., those which from their surroundings, or from their structure, are not fit for human habitation, and those which may be made habitable by structural alterations, or by ordinary sanitary improvements. According as the certificate of the medical officer of health and the report of the surveyor will show the class of dwellings to which they belong, they should be referred either to the Metropolitan Board of Works, or other central authority, to be pulled down, or to the local authority to be amended. It would, however, be comparatively useless for the

* Read at the Meeting of the Society of Medical Officers of Health, December 21, 1883.

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former course to be adopted unless the amount payable as compensation, and the cost of the reference to the arbitrator, be reduced. The time occupied in dealing with these cases should also be much diminished by a simplification of the present complicated procedure. Quicker and surer work must be made with houses structurally unfit for habitation, than at present obtains. The rights of owners should not be allowed to override the public weal, so that the value of the houses, their present condition being taken into account, and not that based upon the enormous rents so often obtained, and without any addition for compulsory purchase, should alone be paid. If this were the law, persons would not buy up the leases of dilapidated houses and let them without proper repair, as is often done now.

No house should be allowed to be occupied after it had been legally decided to be unfit for living in, even during an appeal from the decision. Summary powers should, therefore, be given for the closing not only of such houses, but of others where a magistrate had ordered work to be done within a certain time, and the landlord had neglected to carry out the order, or in default of payment of penalties.

The pulling down of unhealthy dwellings is, however, only the first step in the process; the next is the rebuilding; when new considerations have to be entertained. It seems clear that the rebuilding should not be left to the central authority (Metropolitan Board) or to the local authority, as neither can build so cheaply as private persons, and if they did build there would be suspicions as to what is known as a 'job.' If the new dwellings were built by either of these authorities, they must either be sold at a loss, often great, as their value would only be in proportion to the rental to be obtained, or if the authorities became owners of property the loss would perhaps be greater still, as sufficient oversight could scarcely be given to the collection of rents and to other points in the management of house property. Thus it is well known that some of the most insanitary houses in the metropolis belong to the Ecclesiastical Commissioners. If it be left to private enterprise, unaided by State loans or by charitable help, in only a few cases could houses be built, to afford accommodation for the substratum at a sufficiently low rental. Very badly paid work, excess of population, very great competition for the available work, sickness, as well as indulgence in drink and other bad habits, are at the root of the evil. Emigration has been proposed as a partial remedy, but this would only take away the capable, and leave the incapable of which most of the substratum is composed. The loan of Post Office Savings Bank balances at low rates, say 2¾ per cent., has been proposed, but this would lead to great difficulties, as it would be necessary to have unnecessarily good work and materials put into the buildings under the supervision of a Government surveyor by which the pecuniary advantage derivable from a loan at a low interest would be almost entirely rendered nugatory. It seems, therefore, that private enterprise must be assisted by advances from persons willing to take shares in building these houses, which could in the middle of London not be expected to pay more than 3 or 3½ per cent., even when the ground-floors were occupied by shops with a room or rooms behind them. As, however, these considerations do not come within the province of medical officers of health I will not pursue this part of the subject further, and should not have mentioned it except to show the difficulties attending the reconstruction of dwellings under these or any similar Acts.

The other class of houses—viz., those capable of improvement—can be dealt with to a great extent under the present laws, but increased powers should be given to the local authorities and their officers, and additional magistrates ought to be provided in the metropolis for the more speedy adjudication on summonses for sanitary neglect. At present a summons taken out at the Worship Street Police Court is rarely made returnable in less than a fortnight, and the hearing is then often postponed for a week in consequence of the press of business. The plan which I would propose for dealing with this kind of property is as follows:—Every house let in lodgings or occupied by the poor should be regularly visited twice a year by an inspector, and more often on complaint being made, and notices should be served and enforced as regards the removal of all nuisances or defects found on the premises. The owners of these houses should be served with notices under the 35th section of the Sanitary Act, to do all that was necessary for cleansing and repairing the premises. The regulations made under this section should be uniform for the whole of London, instead of being, as at present, different in several parishes or districts which have made them. If the owner neglected to comply with the notices by a given day, he should be subject to a penalty of, say, not less than 5*s.* per day during which default was made. The name and address of the legal owner—*i.e.* the person receiving the rent—as well as of the actual owner, should be sent, under a penalty, to the office of the local authority for registration, so that there should not be any difficulty as to the service of notices. If, after having been summoned for the penalties, the owner still made default, the local authority should have power to close the room, or the whole house, if necessary, after having had a second notice served upon him of their intention to do so. An order of the magistrate to do structural works might be appealed against, but the house should be shut up during the appeal. No appeal should be allowed either as to penalties or the carrying out of ordinary sanitary work, such as the amendment or cleansing of drains, cleansing and ordinary repair of premises, providing an improved water supply to closets, or a separate supply for domestic purposes distinct from that for the closet. The power of appeal which already exists to the Metropolitan Board of Works as regards works done under the Metropolitan Local Management Act might still remain, as that refers, amongst other things, to the mode of and the materials used for the drainage of houses.

In this enumeration of things requisite to be done, I have referred to the provisions of a domestic water supply separate from that of the closet, as there is at present no distinct power to enforce this in London which ought to be speedily given. There are also many other comparatively slight alterations in the Nuisances Removal Acts which might be beneficially introduced in order to obtain a more efficient and speedy removal of nuisances, not only in the class of houses under consideration, but in others, whether occupied by the poor or rich.

In settling the regulations for the keeping of houses occupied by more than one family in good sanitary order, the cubical space to be allowed for each inmate must receive full and careful consideration, as if fixed too high it would raise rents unduly, and if fixed too low would be injurious to the in-

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habitants. If this were fixed, say, at 350 cubic feet for each grown-up person, and a smaller number for each child under twelve, there would be no objection to persons of different families, but of the same sex, occupying a room, but indecent occupation should be strictly prevented under heavy penalties, the person underletting the room or rooms being first made responsible, and secondly the owner, for not taking steps to evict his tenants. All direct connections of sink pipes, &c., with the drains should be prohibited, and all bell traps be removed, and other more efficient traps be substituted; and, as regards newly-erected houses, proper means for ventilating the house drains and cutting off direct communications with the sewers should be used. It would also be well if these regulations applied not merely to artisans' dwellings, but to all houses. It would also be most advisable that persons wilfully or carelessly damaging water-closets, traps, and other sanitary fittings, or their parents, if children, should be compelled by a summary process to pay the cost of reinstating the damaged articles.

The chief alterations in the law which I propose may be briefly summed up as follows. That there should be a central authority to whom all reports of houses unfit for human habitation in consequence of their surroundings, or of their defective structure, should be referred; and that improvements should be made in the cost of, and the procedure for, acquiring these houses and the land upon which they are built, as well as the regulations under which the new dwellings are to be erected.

That houses which can be rendered fit for habitation without being pulled down should be dealt with by the local authority, the certificate of the medical officer of health and the report of the surveyor to determine to which body the matter should be referred in the first instance.

That regulations should be made for the whole of London for enforcing a periodical cleansing and repairing of houses at a less rental, say, than 20*l.* a year, and of all houses let in lodgings; that a register should be kept at the office of the local authority for registration of the name of the owner. That the local authority should be able to close the whole or part of such house after the owner had been summoned before a magistrate for penalties for neglect, and he had made continued neglect in performing the work requisite to put the premises in a good sanitary condition. Provided always that a second notice should be served upon the owner, giving him a reasonable time previously to taking such a step.

Before concluding, I would remind you that this is a short-paper night, when the discussion is considered to be of as much importance as the paper, so that I have only laid before you a brief sketch of the most important alterations required. Indeed, considering that the discussion of this subject has been very extensive, I scarcely think it is necessary that I should have extended my remarks to greater length.

THE new closets and flushing cisterns comprised in the extensive improvements now being carried out at the Royal Naval Hospital, Stonehouse, of which an account is given in the SANITARY RECORD of Dec. 15, 1883, p. 329, are, we are informed, supplied by Mr. Thomas Twyford, of Hanley. The closet is the 'Crown' Patent Closet, to which reference is made in the *compte-rendu* of the Glasgow Exhibition of the Sanitary Institute, published in the SANITARY RECORD of Oct. 15, 1883.

SANITARY AID AND DWELLINGS' COMMITTEES.

By GERTRUDE TOYNBEE.

THE chief reason for the existence of Sanitary Aid Committees is the fact that the occupants of tenement houses do not themselves, as a rule, make complaints to the local authorities of the unsanitary condition of their houses. At present the obstacles in the way of their doing so are insurmountable. In the first place the landlord can punish them in various ways for making any complaint. They may owe a little rent, and he can therefore put the brokers in upon them, or even if they owe no rent he can give them notice to quit. He is always sure of another tenant immediately, and he is rather glad than otherwise to make a change, as he can make this an excuse for raising his rent. But, supposing that the landlord does not resort to either of these means of punishment, he can make the tenant's position very unpleasant by abusive and threatening language and by setting the fellow lodgers against him, and, considering that the landlord has a weekly interview with his tenants, and that they are often represented on this occasion by women who are jaded and worried by their daily work and anxieties, such conduct on the landlord's part is a real hardship for the tenants. If lodgings were plentiful and earnings were higher the tenants might stand on equal terms with the landlord, because when unfairly treated by him, they could move into fresh rooms. But at present a move is, as a rule, a matter of great difficulty to a working man. He may look out for weeks in vain for suitable rooms, and then in the end be forced to put up with anything he can get, however unhealthy or undesirable, because neither he nor his wife have really the time to spare for house-hunting. Besides this, the expense of a move cannot always be met by working people.

Sometimes, however, a nuisance in a house is caused by fellow-lodgers. They will persist in putting all kinds of horrible refuse into a dustbin, or they will carry on some trade in a most offensive manner. For instance, a man who sold rabbit-skins has been known to keep them hanging up a week or more in his room; a fishmonger has put putrid fish into the dustbin; a costermonger has constantly kept stale fish in his room all night; a rag and bone shop has filled the neighbouring house with sickening smells; a sweep has kept a large supply of soot in a dwelling-house, uncovered, and in such a position as to fly about into the lodgers' rooms and into the uncovered cistern; a manure heap, six feet high, has been allowed to remain ten days at a time close to the windows of crowded houses. In these cases it is fear of the neighbours that prevents the sufferers from complaining. The authors of such abuses are often low characters, more or less violent and drunken, who would not be scrupulous as to their means of revenge.

But supposing that a working-man has the courage to make a complaint to the local authorities, there are difficulties in the way. He must either write a letter, or go himself to the officials. To write a letter is not always easy for working people; but, supposing it is done, it is very probable that no notice will be taken of it by the authorities. Supposing he goes up to see them, he may have to wait, or to come again, in order to catch the right official,

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but as he is hard at work, he cannot spare the time or this, and so he makes up his mind that he cannot get redress, and things go on as before. Now a Sanitary Aid Committee makes complaints to the local authorities on behalf of the tenants, and the reason that they are willing to make use of it is that it never men tions the names of informants. Should the landlord or others ask the tenants who has made a complaint, they have simply to say the Sanitary Aid Committee.

Doubtless an active body of officials does find out a great deal about the unsanitary condition of their district by means of house-to-house inspection, but there is a great deal that they cannot find out unless complaints are made to them, hence any agency which sets itself to work to make complaints, will be the means of giving the officials valuable information which they would not otherwise obtain. There is another point to be noted here. In a large and crowded London district a house-to-house inspection of all the tenement houses would take so long that there would be time for all sorts of evils to break out again in the houses first inspected before the whole tour of inspection had been completed. And this is what constantly occurs. Unless a much larger body of officials is employed than is at present the case, it must be impossible for them to keep a constant watch on all their old cases; and yet, unless this is done, the sanitary laws will be constantly set at defiance, both by landlords and tenants. This is another difficulty which can be more or less met by a Sanitary Aid Committee, for part of its work is to keep a watch on all cases in which the cause of complaint is likely to recur, so as to report them again, if necessary, to the local authorities.

Of course complaints as to the condition of tenement houses are made to the authorities occasionally by those in the habit of visiting them, such as district visitors, medical men, relieving officers, clergy, and others, but it is commonly found that complaints from *individuals*, either receive no attention at all from the authorities, or, if they do, it is because the individual has persisted with the complaint until something has been done. Comparatively few people have the energy or the time to do this, and, if they have, they cannot always watch over their cases afterwards, so as to prevent a recurrence of the evils removed.

Another advantage of a Sanitary Aid Committee is, that it is independent of many considerations which hamper the sanitary officials. Without imputing any unworthy motives to the latter, we must admit that, as members of an official body, they are more or less dependent on each other, and, as a spirit of uncompromising reform is not the usual characteristic of such a body, any member showing a disposition to act in such a spirit would be objected to by his colleagues.

A man may be a very good official, and may show a certain amount of zeal in his work, but, unless he has a very exceptional enthusiasm for reform, you will not find him willing to take such a line of action—however desirable it may be for the public good—as will put him in an antagonistic position towards those he is bound to work with. Hence it is found that prompt and unflinching application of the sanitary laws is far too rare, and that there is a good deal of compromise and delay in the dealings between the officials and the landlords. Reasons of various kinds have been given for this state of things, both by the officials, and by their opponents; but it is sufficient here to state that it is a fact, and a fact against which Sanitary Aid Committees must do battle. Compromise and delay become serious evils when they mean the prolonged endurance on the part of thousands of people, of conditions which are daily increasing disease and vice. What the Sanitary Aid Committee says to the officials is this: 'Here is an evil pronounced by the sanitary laws to be illegal—the landlord has allowed it to go on for months, perhaps years, in spite of the complaints of his tenants. What right has he to any time beyond what is absolutely necessary for carrying out your orders?' There is no doubt that firm and continued insistance on this point by an independent outside body, representing public opinion, will prove a wholesome stimulus and a support to official action. The condition of the homes of the working people in London proves that we have been wrong to leave the duty of enforcing the sanitary laws solely to a small band of paid officials. The interests at stake are too great for us to dare to do so any longer. A great and immediate reform is needed; but it can only be carried out with the aid of volunteer workers. Let such come forward now in every district of London, and band themselves together in Sanitary Aid Committees, and this great cause will be won.

As there is one Sanitary Aid Committee at work in a crowded district of London, it may be useful to give the following details about it. Its objects are as follows: To receive complaints of the sanitary defects in the tenement houses within the area supervised by the committee. To report these defects to the right authorities, and to see that they do their utmost to remedy them. Some of the special sanitary defects to be looked out for are—uncovered cisterns and waterbutts, insufficient water supply, bad drainage, uncovered and offensive dust-bins, &c.

Another of the committee's objects is to get 'disorderly houses' closed. The reason they include this in their work is that there is still greater difficulty in getting complaints made by tenants with regard to these houses than there is with regard to sanitary defects, and also the committee have exceptional opportunities of coming across these houses in the course of their work.

The committee being formed, they at once enlist a certain number of people who will undertake to visit their cases. The committee and their visitors make themselves acquainted with the following sanitary laws:—

The Nuisances Removal Act, 1855.
The Metropolitan Buildings Act.
The Act of 1860, 23 and 24 Vict.
The Public Health Act, 1866.
The Act of 1874, 37 and 38 Vict.
The Artisans' and Labourers' Dwellings Act, 1875.
The Act to Amend the Same, 1879.
The Act to Extend the Powers of the Artisans' Dwellings Act of 1868, 1879.
The Metropolitan Management Acts. (See p. 337.)

The committee also make themselves acquainted with certain elementary works on the sanitation of houses. One of the most useful of these is 'The Habitation in its Relation to Health,' by Professor de Chaumont, F.R.S., published at 1s., by the Christian Knowledge Society. Their next step is to get information as to the state of the tenement houses in their district. For this purpose they invite the co-operation of all who are in the habit of visiting these houses

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such as relieving officers, medical men, nurses, city missionaries, scripture readers, Biblewomen, 'Sisters,' school board visitors, district visitors, clergy of all denominations, and lastly the tenants themselves. Every complaint is sent to the hon. secretary, who has it verified by one of the committee's visitors, and then brings it before the committee. If they decide that it is to be sent up to the medical officer of health, the secretary sends it, and in the course of the fortnight which passes before the next committee meeting, a visitor goes again to the case to see whether the sanitary inspector has attended to it. Supposing he has been and has given certain orders to the landlord, the visitor goes again in the course of another fortnight to see what has been done.

If complaints are not attended to by the proprietor or the landlords, they are sent up again and again to the medical officer of health until satisfactory action is taken. The secretary keeps the history of every case brought before the committee. The experience gained by the committee during the six months they have been working has confirmed them in their opinion as to the necessity of their work. They find evils of a grave character far more widespread than they anticipated. In many cases they have been successful in getting these evils removed; in others, where after waiting for months they have got very little done, they consider that there has been a great deal of unnecessary delay in the dealings of the officials with the landlords, and they hope that by constant and careful action on their part they may be the means of at any rate lessening such delay in the future. They have found the tenants unanimous as to the need of a Sanitary Aid Committee. Their one anxiety is that their names should not be mentioned; when they are reassured on this point they are glad enough to complain.

It is encouraging to know that a Sanitary Aid Committee, or Local Board of Health as it was called, worked most successfully in the district of Regent Square, St. Pancras, for a year from October 1853. Their work was on a grander scale than that which has been described here, inasmuch as they employed a sanitary inspector of their own, and had the services of an honorary architect. The following is the report of their year's work.

205 cesspools abolished, or in course of removal.
206 foul house drains renewed, cleansed, or about being so treated.
367 sinks trapped.
200 glazed earthenware pans and syphons fixed.
125 closets repaired, or rebuilt.
204 closets supplied with water.
198 houses, areas, and yards lime-whited.
34 houses supplied with water by the New River Company.
16 roofs repaired and made water-tight.
17 rain-water down-pipes repaired or renewed.
41 cases of refuse removed from cellars, &c. &c.

The last words of the Report, which was drawn up by the honorary architect and secretary of the committee, Mr. Edward Cookworthy Robins, will make a fitting conclusion to this paper. They are as follows:—'Whatever plan he adopted by the Legislature, there will still be room left for private enterprise, and if what is here reported to have been done under admittedly defective sanitary laws, is sufficient to encourage others to "go and do likewise," the Board will feel amply recompensed for their labours in endeavouring to establish a precedent for local sanitary exertion.'

THE LAWS CONCERNING ARTISANS' DWELLINGS.

It is worth while at the present moment, when the question of the homes of the poor occupies so large a share of public attention, and demands are being made for further and more stringent legislation, to examine the actual state of the law on the subject, and its sufficiency, or otherwise, for the objects desired. The measures on the statute book which affect the houses occupied by the poorer classes may be divided into five categories:—

1. *The Acts as to the Removal of Nuisances*, which, for the Metropolis, are the Nuisances Removal Act, 1855, the Sanitary Act, 1866, and the Sanitary Law Amendment Act, 1874; and for the rest of England and Wales, the Public Health Act, 1875.

2. *The Artisans' Dwellings Acts*, 1868 *to* 1882 (*Mr. Torrens's Acts*). These include the Artisans' and Labourers' Dwellings Act, 1868; the Artisans' and Labourers' Dwellings Act (1868) Amendment Act, 1879; and Part II. of the Artisans' Dwellings Act, 1882. These Acts are applicable to all towns having 10,000 inhabitants or more.

3. *The Artisans' and Labourers' Dwellings Improvement Acts*, 1875 *to* 1882 (*Sir Richard Cross's Acts*), viz., the Artisans' and Labourers' Dwellings Improvement Act, 1875; the Artisans' and Labourers' Dwellings Improvement Act, 1879; and Part I. of the Artisans' Dwellings Act, 1882. These Acts apply to all towns having a population of 25,000 persons or more.

4. *The Labouring Classes Lodging Houses Acts*, which include the Labouring Classes Lodging Houses Act, 1851; the Labouring Classes Lodging Houses Act, 1866; and the Labouring Classes Dwelling Houses Act, 1867. These Acts may be adopted by any urban authority, and also for any parish containing a population of not less than 10,000 persons.

5. *The Acts authorising Regulations as to Tenement Houses*, which, for the metropolis, are the Sanitary Act of 1866 and the Sanitary Law Amendment Act of 1874, and for the rest of England and Wales the Public Health Act, 1875.

1. *As to the Removal of Nuisances.*—It is the duty of the local authority to make from time to time, either by themselves or their officers, inspection of their district with a view to ascertaining what nuisances exist calling for abatement, and to enforce the provisions of those Acts for the purpose of securing the abatement of nuisances. (Sanitary Act, 1866, sect. 20; Public Health Act, 1875, sect. 92.)

The word 'nuisances' includes 'any premises in such a state as to be a nuisance or injurious to health; any . . . privy, drain, or ashpit so foul as to be a nuisance or injurious to health; any accumulation or deposit which is a nuisance or injurious to health; and any house or part of a house so overcrowded as to be dangerous or prejudicial to the health of the inmates.' (Sanitary Act, 1866, sect. 19; Public Health Act, 1875, sect. 91.)

If, after notice, a nuisance is not abated, or, if after notice, it is discontinued, but is, in the opinion of the authority, likely to recur on the same premises, it is their duty to institute proceedings before justices. (Nuisances Removal Act, 1855, sect. 12; Public Health Act, sect. 95.) The justices are empowered by their order to require the person on whom the order is made—(1) 'To provide sufficient privy accommodation, means of drainage, or ventilation, or to make safe and habitable, or to pave, cleanse, whitewash,

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disinfect, or purify, the premises which are a nuisance or injurious to health;' or (2) 'to amend or remove the privy, drain, or ashpit, which is a nuisance or injurious to health, or to provide a substitute for that complained of;' or (3), 'to carry away the accumulation or deposit which is a nuisance or injurious to health,' and, further, to do such other works or acts as are necessary to abate the nuisance complained of. (Nuisances Removal Act, 1855, sect. 13. Sect. 96 of the Public Health Act is more general in its wording, but is of much the same purport.)

If the justices consider that the same or a similar nuisance is likely to recur, they may further prohibit its recurrence, and direct the execution of the works necessary to prevent such recurrence (Nuisances Removal Act, sect. 13; Public Health Act, sect. 96); and if, in their judgment, the nuisance is such as to render the house unfit for human habitation, they may prohibit its being used for that purpose until it is rendered fit for habitation, and in that case the house may not be let or inhabited until, by a further order, the justices have declared that it is habitable (Nuisances Removal Act, sect. 13; Public Health Act, sect. 97). A person not obeying an order for abatement, if he fails to satisfy the justices that he has used all due diligence to carry out the order, is liable for every such offence to a penalty not exceeding 10*s.* per day during the default, and a person knowingly or wilfully acting contrary to an order of prohibition is liable for every such offence to a penalty not exceeding 20*s.* per day during such contrary action. Further, in the case of such default the authority may enter the premises to which the order relates and remove or abate the nuisance condemned or prohibited, and do whatever may be necessary in execution of the order, and charge the cost to the person on whom the order is made (Nuisances Removal Act, sect. 14; Public Health Act, sect. 98).

Where a house is certified to the authority by the medical officer of health or two qualified medical practitioners to be so overcrowded as to be dangerous or prejudicial to the health of the inhabitants, and the inhabitants consist of more than one family, the authority are to institute proceedings before justices, and a penalty not exceeding 2*l.* may be imposed on the person permitting the overcrowding (Nuisances Removal Act, sect. 29. No similar provision in Public Health Act). When two convictions in respect of the overcrowding of the same premises are obtained within a period of three months, whether the persons convicted are or are not the same, the justices may order the closing of the house for such time as they may deem necessary (Sanitary Act, 1866, sect. 36; Public Health Act, sect. 109).

2. *As to the Artisans' Dwellings Acts*, 1868 *to* 1882 (*Mr. Torrens's Acts*). The primary object of these Acts is to secure the improvement or demolition of houses which are 'in a state dangerous to health, so as to be unfit for human habitation,' but they also empower the local authority to deal with any 'obstructive building'—*i.e.* a building which, although not in itself unfit for human habitation, is so situated that, by reason of its proximity to other buildings, it stops ventilation, or otherwise makes or conduces to make such other buildings to be in a condition unfit for human habitation, or prevents proper measures from being carried into effect for remedying the evils complained of in respect of such other buildings. Under these Acts, on the report of the medical officer of health that any premises are unfit for human habitation, the authority are to ascertain from a surveyor or engineer whether the causes of the evils can be remedied by structural alterations and improvements, or whether the premises ought to be demolished (sect. 5, Act of 1868). In the former case the authority are empowered to require the owner to execute the necessary structural alterations, and, on default, they may order the closing or the demolition of the premises, or may themselves execute the necessary works at the expense of the owner (sect. 18). If the report of the engineer or surveyor is to the effect that the premises should be demolished, they may order the demolition of the premises, and, on default of the owner, may themselves take down and remove them (sect. 20). The authority may in like manner require the removal of an 'obstructive building,' as defined above. When, however, an order is made on an owner for the execution of works or the demolition of a building which is unfit for human habitation, the authority may be required by him to purchase the premises (sect. 5 of Act of 1879). Where the authority thus acquire lands, they or their lessees are to hold the property on trust, first, for providing the labouring classes with suitable dwellings within the jurisdiction of the authority by the construction of new buildings or the repairing or improvement of existing buildings; and, secondly, the opening out and widening of closed or partially closed alleys or courts inhabited by the labouring classes by pulling down any building or otherwise leaving such open spaces as may be necessary to make the alleys or courts healthful (sect. 14 of Act of 1879).

3. *As to the Artisans' and Labourers' Dwellings Improvement Acts*, 1875 *to* 1882 (*Sir Richard Cross's Acts*). The object of these Acts is to facilitate the removal, rearrangement, and reconstruction of houses, courts, and alleys in the poorer and more densely populated parts of London and of the larger urban sanitary districts. The Act of 1875 recites:—'That various portions of many cities and boroughs are so built, and the buildings therein are so densely inhabited, as to be highly injurious to the moral and physical welfare of the inhabitants; that there are in such areas a great number of houses, courts, and alleys, which by reason of the want of light, air, ventilation, or of proper conveniences, or from other causes, are unfit for human habitation, and fevers and diseases are constantly generated there, causing death and loss of health, not only in the courts and alleys, but also in other parts of such towns; that it often happens that, owing to the above circumstances, and to the fact that such houses, courts, and alleys are the property of several owners, it is not in the power of any one owner to make such alterations as are necessary for the public health; and that it is necessary for the public health that many of such houses, courts, and alleys should be pulled down, and that such areas should be reconstructed, and that, in connection with the reconstruction of those areas, it is expedient that provision be made for dwellings for the working class who may be displaced in consequence thereof.'

This Act and the amending Acts contemplate the dealing with whole areas when the houses are so structurally defective as to be incapable of repair, and so ill-placed with reference to each other as to require, to bring them up to a proper sanitary standard, that they should be demolished and recon-

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structed. The authority for the carrying out of the Act is, in the City of London, the Commissioners of Sewers; for the rest of the metropolis, the Metropolitan Board of Works; and in the other places to which the Acts apply, the town councils or local board. Mr. Torrens's Act of 1868 having given power to make isolated improvements in the structure of houses, Sir Richard Cross's Act of 1875 gave power to the local authority, on an 'official representation' by the medical officer of health that a particular area is unhealthy, to take down the buildings covering any area in an unhealthy district, and lay out and complete streets therein. The scheme of the authority must be approved by the Local Government Board (or Secretary of State in the case of the metropolis), and sanctioned by Parliament before it can be acted upon.

The present state of the law as regards accommodation for displaced workmen is important to be noted. Under sect. 5 of Sir Richard Cross's original Act of 1875, it was necessary that the scheme should provide for the accommodation of at the least as many persons as might be displaced in suitable dwellings, which, unless there were any special reasons to the contrary, were to be situate within the limits of the same area, or in the vicinity of it.

The Act of 1879 provided, however, by sect. 4, that where it was proved that equally convenient accommodation could be provided for any persons displaced at some other place, and it was also proved that the required accommodation had been or was about to be forthwith provided, the confirming authority might authorise the scheme, or permit a modification of it. Moreover, the Act of 1882 provided that in the case of an improvement scheme which comprises an area in the metropolis or the City of London, the Secretary of State may on the application of the local authority, and in view of the special circumstances of the locality and of the number of the artisans and others belonging to the labouring class dwelling within the area, and being employed within a mile of it, dispense in the provisional order authorising the scheme altogether with the obligation of the local authority to provide for the accommodation of the persons of the working class who may be displaced by their scheme to such extent as he may think expedient, but not exceeding one-half of the persons displaced.

In the case of an improvement scheme elsewhere than in the metropolis or the City of London, if the Local Government Board so require, the scheme must provide for the accommodation of such number of persons displaced in suitable dwellings to be erected in such place or places either within or without the limits of the area as the confirming authority on a report made by the officer conducting the local inquiry may require. If the confirming authority do not require this, it is not obligatory on the local authority so to frame their scheme. (Act of 1882, sect. 3.)

A local authority may, for purpose of providing accommodation for the working classes displaced by an improvement scheme, appropriate any lands belonging to them which are suitable for the purpose, or may purchase by agreement any further lands as may be convenient. (Act of 1879, sect. 4.)

4. *As to the Labouring Classes Lodging-houses Acts.*—These Acts provide the means by which any parish with a population of 10,000, or two or more neighbouring parishes in combination having an aggregate population of not less than 10,000 persons, may constitute commissioners for the purpose of providing lodging-houses for the labouring classes. The commissioners may purchase or rent land, and on such land erect buildings suitable for lodging-houses for the labouring classes, and convert any buildings into lodging-houses for the labouring classes, and may alter, enlarge, repair, and improve the buildings, and may fit up, furnish, and supply them with the requisite furniture, fittings, and conveniences (sect. 36 of Act of 1851). The commissioners may also contract for the purchase or lease of any lodging-houses for the labouring classes in their parish, and may appropriate the houses to the purposes of the Acts, with such additions or alterations as they deem necessary (*ib.* sect. 37).

5. *As to Regulation of Tenement Houses.*—By sect. 19 of the Sanitary Act of 1866, the Secretary of State is authorised to empower local authorities, on their application, to make by-laws for fixing the number of persons who may occupy a house or part of a house which is let in lodgings, or occupied by members of more than one family; for the registration of houses so let and occupied and for their inspection; for enforcing the provision of privy-accommodation; for promoting cleanliness; and for cleansing and limewashing of the premises at stated times. The Sanitary Law Amendment Act of 1874 extended this section so as to give power to the Local Government Board (who had meanwhile replaced the Secretary of State as the central health authority) to declare the enactment to be in force in any part of the metropolis or the provinces *at their discretion*, by notice to be published in the *Gazette*. The power to make by-laws was at the same time enlarged so as to include regulations affecting the ventilation of rooms, paving and drainage of premises, the separation of the sexes, and notices to be given and precautions to be taken in case of any dangerously infectious or contagious disease. The Acts of 1866 and 1874 are still in force in the metropolis. As regards the rest of the country, they have been superseded by the Public Health Act of 1875, sect. 90 of which deals with the question of 'houses let in lodgings.'

The powers of the Local Government Board are confined to the putting in force of the enactment authorising the local authority to make by-laws. They have no power to compel the local authority to frame by-laws, or to exercise them when framed, though all such by-laws must be submitted for their sanction. Looking to the state of things existing in many parts of the metropolis, this lack of compulsory powers is perhaps to be deplored, though the mere making of by-laws is of course a very different thing from their adequate and sustained enforcement. But at any rate the Local Government Board have done what they can to raise local authorities to a sense of their duty in the matter by announcing in the *Gazette* of the 28th ult. that they have declared the section of the Sanitary Act dealing with 'houses let in lodgings' to be in force in the nineteen districts of the metropolis where it has not already been put in force on the application of the local authority. These districts are the parishes of Marylebone, St. Pancras, Paddington, Newington, Clerkenwell, Camberwell, Bermondsey, St. George's (Hanover Square), St. Martin's-in-the-Fields, Hampstead, and the district boards of Greenwich, Wandsworth, Holborn, Fulham, St. Saviour's, Plumstead, and Lewisham. The remaining districts appear to have already taken

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action in the matter at various times, and it is believed that in some of them by-laws imposing regulations on tenement houses are still extant. But for all practical purposes the section has remained a dead letter throughout the metropolis, and the Local Government Board have therefore done quite wisely in making it of universal application, and of stirring up the vestries to take action under it.

The model regulations which have been drafted by the Local Government Board on this subject-matter appear admirably adapted for their intended object. There can be no reasonable doubt that, by a judicious exercise of such regulations, local authorities might do much to secure a material improvement in the sanitary condition of the dwellings of the poorer classes.

It has been argued in some quarters that to impose regulations upon 'houses let in lodgings' would be to burden with grievous and unnecessary restrictions many houses of a good class that, through force of circumstances, are occupied by lodgers or by members of more than one family. True; but such houses could easily be exempted from the operation of the by-laws by a clause restricting the powers of regulation and inspection to houses below a certain rateable value, or houses where the rent of each lodger was less than a certain minimum. Such a clause appears, indeed, in the model by-laws of the Local Government Board; and it would surely not be difficult for an authority cognisant of the sanitary circumstances of its district to fix a standard which will exempt decent people from the restriction and supervision which are absolutely necessary for the lowest grades of society.

The regulations of the Local Government Board provide that, as regards any house or part of a house which is let in lodgings or occupied by members of more than one family, where the rateable value is below a fixed sum, the landlord or the chief lodger is to be prohibited from suffering a greater number of persons using any room exclusively for a sleeping apartment than will admit of the provision of 300 cubic feet of free air space for each person exceeding 10 years, and of 150 cubic feet for each person under 10 years of age; or any room not used exclusively for the purpose than will admit of the provision of 400 cubic feet of air for each adult and of 200 feet for each child. The landlord is required to supply the information necessary for the registration of his house by the nuisance authority with regard to the total number of rooms in the house, the total number of rooms let in lodgings or occupied by members of more than one family, the manner of use of each room, the number, age, and sex of the occupants of each room used for sleeping, and other particulars. Provision is made for free access to any lodging-house and the rooms thereof by the medical officer of health, the inspector of nuisances, or any other officer specially appointed by the local authority, for the thorough cleansing by the lodgers of courts, areas, and other open spaces, for the keeping water-closets in order and properly ventilated, and ashpits in a wholesome condition. Every lodger is to cause the floor of every room let to him to be thoroughly swept once a day and thoroughly washed once a week, and every fitting and painted surface to be thoroughly cleansed from time to time. Provision is also made for the cleansing of passages, staircases, and cisterns. The landlord is required to provide adequate sanitary accommodation, with an ample supply of water, and to cause every part of the premises to be cleansed once a month. Lodgers are required to have every window of every room opened for two hours each day, weather permitting, while both landlords and lodgers are required to give information to the proper authorities of the breaking out of dangerously infectious or contagious disease, and to secure the removal of the person affected to hospital. Penalties are imposed upon those who break the regulations.

If all these powers were intelligently and vigorously exercised, it is difficult to believe that an enormous amount of improvement would not be speedily manifested, and the need for any further legislation would vanish.

AN ACCOUNT OF THE WORK DONE IN THE PARISH OF ST. MARYLEBONE UNDER THE ARTISANS' AND LABOURERS' DWELLINGS ACTS.*

By A. WYNTER BLYTH, Medical Officer of Health for Marylebone.

TWO ideas have been for some time industriously disseminated among the public—viz., that no London Vestry has properly put in force 'The Artisans' and Labourers' Dwellings Acts,' and that, if the Acts were rigidly and thoroughly worked, such action would be a boon to the poor.

It is my desire to give a fair and impartial history of what has been done by the Vestry of St. Marylebone, both under Mr. Cross's Act and under the Acts associated with the name of Mr. Torrens. Their history will, I think, go far to show that the first idea is altogether erroneous, at all events so far as St. Marylebone is concerned, for the Acts have been applied wherever and whenever it seemed necessary. I will conclude my paper by studying the effects on the poor of the operation of the Acts.

Since only one instance has occurred in which a representation was made under the Act of 1875 (Mr. Cross's Act), it will be convenient to take that out of the order of time and briefly to relate the circumstances under which the representation was made.

A little more than two years ago a narrow passage from the Edgware Road, just north of Bell Street, led to Linton Place and Bowman's Buildings, rows of little two-roomed cottages, very small and low, consisting of only one storey; in structure and appearance the kind of shanty the colonist knocks together at the edge of the waste. I need scarcely detain you with an account of their dampness, want of drainage, and defective sanitary state. It is enough to say that they formed the central feature of a scheme submitted to the Board of Works by my predecessor in 1876. The scheme enumerated four blocks of unhealthy areas, block No. 1 being Bowman's Buildings, with certain continuous streets, courts, and alleys; block No. 2, Providence Place; block No. 3, Edward's Place; and block No. 4, Britannia Gardens. The first area alone was taken up by the Board of Works. It is, however, interesting to observe that two out of the three remaining have been dealt with successfully under Mr. Torrens' Act, for Britannia Gardens and Edward's Place have been practically wiped out of existence, and of the four areas, one only, Providence Place, remains. The Bowman's Buildings area included 800 persons

* Read at the meeting of the Society of Medical Officers of Health, Dec. 21, 1883.

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living in 383 tenements, which would give about two inhabitants to a room if equally distributed. The average rent per room worked out at a little over two shillings; about twenty families occupied the little two-roomed shanties alluded to, and paid from four shillings to five shillings weekly. The death-rate of the area was estimated from the Registrar's returns in 1876, on a three years' basis, to be about eighteen per thousand, in other words, they died at that rate in *their own homes*; but I need scarcely remind the society that not more than half or two-thirds of the tenants would die in their own homes, for if they were attacked with fever, or, indeed, other acute affections, they would for the most part be admitted into hospital, so that the quite rural death-rate of eighteen per 1,000 represents something really much higher. The representation was made in 1876, but it was not until 1878 that a provisional order was obtained. In 1880 the houses were not only standing, deteriorated of course in structure and sanitary state, but I was obliged to recommend and enforce some temporary repairs. Nor was it until 1881 that the tenements were evacuated. At the present time not one of the 800 displaced lives there, for most of the land is 'to let.' On one portion a large composite block of artisan dwellings of the usual type is in course of erection. In this case seven years will have elapsed since the representation of the medical officer of health and the actual erection of any new buildings; if the 800 people expelled from the condemned area desire to be rehoused on the old land they will have had to wander three or four years before this facility is afforded them, and when that facility is afforded, without doubt have to pay a higher rent.

From the return at page 342, it will be seen that Mr. Torrens' Act has been put in force no less than twenty-five times; under its provision fifty-three houses have been ordered since 1868 to be demolished, and fifty-one repaired. The number of people displaced from the demolished houses are, according to my calculations, about 380, making, with the 800 before mentioned, a total of 1,180 as the entire number of people displaced by the two Acts. It will be also noticed on referring to the return that, in more than one case, successive reports have been made on the same premises, *e.g.* two houses in Charles Street, Lisson Grove, were reported upon in 1877, and an order made for their repair; in December 1880 I was by no means satisfied with their state, and I reported them under the Act; the surveyor considered them capable of repair, and certain repairs were carried out, yet the condition of these houses was such in the following year that I had no hesitation in again making a report. This time the surveyor declared them not capable of structural repair; thus they were demolished after three successive repairs in four years. Take again Edward's Place, a *cul de sac* that was tenanted for the most part by an Irish colony, in which the houses, never very well built, were always in a disgraceful sanitary state. It was reported under the Act by my predecessor in 1880, and finally demolished as a result of my reports in 1882 and in 1883. In one case I made a report on a part of a house only, that is, a separately inhabited building at the rear of a house, and the order has been issued for its demolition, the freeholder not opposing. A glance at the Definition clause, sect. 3, of the 1868 Act, will show that this is not *ultra vires*, for the word 'premises' is defined to mean any dwelling-house or inhabited building. My own tenure of office only dates since the Act of 1879, and therefore my action has of course been regulated by that Act, the chief feature of which is the famous purchase clause (sect. 5), enacting that 'notwithstanding anything in the Act of 1868, the owner of any premises specified in the order of a local authority made under that Act, and requiring him to execute any works or to demolish such premises, may, within three months after service on him of the order, require the local authority to purchase such premises.'

The effect of this is that no authority can make an order for the repair, however trifling the repair may be, without running the risk, if it be one, of being called upon to purchase. The wording here should certainly be altered. As it stands, it does not harmonise with the spirit of the Act, and may very seriously affect its working. It may cause some surprise, seeing the long list of cases dealt with since 1880, in the face of this purchase clause, that no advantage has been taken of it until recently. But there is an explanation. The greater part of the parish is composed of large estates, and the leases have been within the twenty-one year term; the freeholder, therefore, has not objected, the leaseholder could be ignored, and in one or two of the cases in which the section might have been applied, it is likely enough the owner was entirely ignorant of his power. A case has arisen in Horace Street in which notice has been given to the authority to purchase, and an official arbitrator has been appointed. I had hoped, before this paper had been read, the arbitrator would have given his award, but such is not the case, and, as the matter is *sub judice*, I think it best not to touch upon the many interesting points which may be raised upon the question of the arbitration. It is of course evident that the success of the Act, as it stands, mainly will depend upon the principles that are considered just to adopt in the valuation of the property. It cannot be denied that, so far as the intention of Mr. Torrens' Act goes, that intention has been successfully carried out in Marylebone, but, on the other hand, it must not be forgotten that there have been the facilities already alluded to for its operation, and that no case has been contested. Let me now ask what has been the effect of these improvements on the poor. Of the 1,000 people displaced, one-third of these were certainly of the criminal class, of low and drunken habits; the disturbance of their old haunts renders it more difficult to indulge in thieving with impunity, and they have less money for food and gin. The rest were nearly all poor working people, living from hand to mouth, and with difficulty paying the comparatively moderate rents of their old tenements. The new houses which have been built on the vacated sites are superior to the old, and, naturally enough, superior in rent. Thus in Charles Street, Lisson Grove, the old rent averaged 3*s.* per room, the new 4*s.* This extra shilling is quite sufficient to make it impossible for the old tenants to come back. The main tendency of the Artisans' Dwellings Acts, as at present administered, is to give a better and increased accommodation for the fairly-paid artisan, but to decrease the living room of the labourer, of the needlewoman, and of the class generally denominated as poor. The contentment that a writer in the *Times* speaks of is not a content with a tumble-down tenement, but it is a content with the low rent that its sanitary condition insures. The crossing-sweeper naturally enough prefers his liberty to live in a wretched hole, for which he pays

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1s. 6d. per week, than to have his habitation swept away and be driven into the workhouse. Why, to these people sanitary improvement is a veritable car of Juggernaut, pretty to look at, but which crushes them. Not a house is rebuilt, not an area cleared, but their possibilities of existence are diminished, their living made dearer and harder. The majority of the platform speakers on the homes of the poor have failed to see this, but it is realised painfully by those whose duty it is to put the sanitary Acts in force. If every vestry had worked the Artisans' and Labourers' Dwellings Acts thoroughly, an appalling amount of misery, of overcrowding, and of poverty would have been the result. Until tenements are built in proportion to those demolished at low rents, it is not humane to press on large schemes. What is to be done must be done gradually. The condition of the poor admits of only this one remedy—building, if it be possible on a commercial basis, healthy tenements for which the weekly payment does not exceed a tenth of the weekly wage of the labouring class.

ST. MARYLEBONE.

Proceedings of the Vestry under the Artisans' and Labourers' Dwellings Acts, 1868 and 1869.

Date of Order.	Situation of Premises.	Order of Vestry.	Remarks.
October 28th, 1869...	York Court, Nos. 15, 16, 17, 18, 19, 20, 21, & 22	To be demolished	The order of the Vestry not having been carried out, after the expiration of three months, the Vestry ordered the Surveyor to demolish the premises, which was done.
April 13th, 1871 ...	Stephen Court (6 Houses)	To be demolished	The order of the Vestry not having been carried out, after the expiration of three months, the Surveyor was instructed to demolish the premises, which was done.
April 20th, 1871 ...	St. James' Place, Bell Street (5 Cottages)	To be repaired	Order carried out.
June 1st, 1871	Grafton Court, Nos. 10, 11, & 12	No order made	Owner agreed to carry out repairs.
January 2nd, 1873 ...	Grotto Place, Nos. 1, 2, & 3	No order made	Structural repairs executed.
November 16th, 1876	Britannia Gardens, Moor Street (12 Houses)	To be demolished	The order of the Vestry was suspended conditionally, to enable the owner to sell the premises, and warehouses were subsequently erected there.
April 19th, 1877 ...	Charles Street, Lisson Grove, Nos. 1, 2, 3, & 4	To be repaired	Order carried out.
August 9th, 1877 ...	Salisbury Place, Lisson Grove, Nos. 3 & 5	No order made	Structural repairs executed.
November 1st, 1877...	York Court, Nos. 3 & 9	To be repaired	Order carried out.
June 17th, 1880 ...	Grafton Court, Nos. 10, 11, & 12	No order made	Necessary repairs carried out by owner.
July 15th, 1880 ...	Edward's Place, Seymour Place, Nos. 10, 11, 12, 13, 14, 15, 16, 17, 18, & 19	No order made	Owner carried out necessary repairs.
December 16th, 1880	Charles Street, Lisson Grove, Nos. 1, 2, 3, 4, & 31	No order made	Structural repairs executed.
October 27th and November 3rd, 1881	Charles Street, Lisson Grove, Nos. 1, 2, 3, 4, 12, 13, 15, & 31	13, 15, & 31 to be repaired, 1, 2, 3, 4, & 12 to be demolished	Order carried out. New Improved Dwellings constructed on portion of site.
December 8th, 1881	Orcus Street, No. 13	To be repaired	Owner not having executed repairs, Surveyor was instructed to do so, and executed the works at the Owner's expense.
November 2nd, 1882	Edward's Place, Seymour Place, Nos. 15 & 16	To be repaired	The Freeholder (the Lessee having less than 21 years' interest in the premises) not having executed the repairs after the expiration of three months, the Surveyor was instructed to take down and remove the premises, and to sell the old materials belonging to the same, which was done.
February 22nd, 1883	Edward's Place, Seymour Place, Nos. 8, 9, 10, 11, 12, 13, 14, 17, 18, & 19	To be demolished	The order of the Vestry not having been carried out, after the expiration of three months, the Surveyor was instructed to take down and remove the premises, and to sell the old materials belonging to the same, which was done.

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Date of Order.	Situation of Premises.	Order of Vestry.	Remarks.
February 22nd, 1883	Charles Street, Lisson Grove, No. 6	To be demolished	Order carried out.
March 1st, 1883 ...	Little Durweston Street, No. 15	No order made	The owner having executed certain repairs to the satisfaction of the Surveyor, no order was made in the matter.
March 15th, 1883 ...	Horace Street, No. 17	To be demolished	The Lessee subsequently asked permission to execute certain repairs in lieu of the complete demolition of the premises, and the matter was left in the hands of the Surveyor, and the premises were put in a sanitary condition, being almost wholly rebuilt.
June 21st, 1883 ...	Providence Place, No. 18	To be demolished	Premises rebuilt.
August 9th, 1883 ...	Horace Street, Nos. 11, 12, 13, 14, 15, & 16	To be demolished	Notices of appeal were given to the Vestry with respect to Nos. 11, 12, 13, 15, & 16, but the notice relating to Nos. 11, 12, & 13, was subsequently withdrawn, and the Vestry were required by the owner to purchase the premises, under the 5th Section of the 42nd and 43rd Vict., cap. 64 (Artisans' and Labourers' Dwellings Act, 1868, Amendment Act, 1879). The Vestry have therefore applied to the Local Government Board to appoint an Arbitrator under Section 7 of the above Act, to settle the amount of compensation to be paid. The Vestry have also been asked to purchase Nos. 14, 15, & 16, and the matter is under consideration.
November 1st, 1883	Jane's Place, Great York Mews, Nos. 1 & 2	To be demolished	
November 1st, 1883	Building at the rear of 35 William Street, Lisson Grove	To be demolished	
November 22nd, 1883	Capland Pl. North, Lisson Grove, Nos. 1, 2, 3, 4, & 5	To be repaired	Works in progress.
November 22nd, 1883	George Street, Lisson Grove, Nos. 16 & 17	To be repaired	Works executed.

HOUSING OF THE POOR IN BIRMINGHAM AND THE BLACK COUNTRY.

(FROM OUR OWN CORRESPONDENT.)

AMONG other large towns which have taken up the question of the housing and general condition of the poor are those of Birmingham and Wolverhampton. In both places was there need for something of the kind being done, and in both places have measures been taken for putting in force the operations of the Artisans' Dwellings Act. Birmingham has had the matter longest in hand, having agreed upon an improved scheme affecting a considerable area within a comparatively short time of the passing of the Act. That scheme is still in operation, and is a long way from being completed. The recent agitation respecting the housing of the poor, however, appears to have revived interest in the subject, with the practical result that the Town Council have appointed a special committee, called the Artisans' Dwellings Committee, to which has been delegated the onerous and important task of ascertaining the real condition of the dwellings of the poor in Birmingham, as a preliminary to the amelioration thereof. In most large and thickly-populated centres, whether of agricultural or manufacturing industry, there are to be found rapidly-increasing masses of poverty-stricken people, whose mental energies and physical constitutions are, sometimes slowly, but none the less surely, sapped and ruined by the perpetual anxiety due to the terrible struggle that has to be undergone for a bare supply of daily bread, the overcrowding, and the corrupting influences that are inseparable therefrom. The superficial aspect of poverty and wretchedness may be witnessed any day in the highways and the byways of such places, but the social problem how to remedy the evils which tend to make poverty often so unnecessarily burdensome and wretched, and how to improve the sanitary—or rather, insanitary—conditions under which such people live, can only be solved by a close scrutiny of the dens they inhabit and the circumstances under which they contrive to drag on existence. Birmingham has its slums the same as most other large towns. Its 400,000 inhabitants are not all accommodated in sanitarily disposed and well or sufficiently ventilated houses or apartments. It has rookeries and courts and alleys in abundance, and thousands of its poor exist under circumstances which no time ought to be lost in remedying. Four or five years ago it was calculated that at least one seventh of the entire population of Birmingham lived in courts and alleys.

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The wholesale and wholesome sweep made by the London and North Western Railway Company in carrying out the plans for their gigantic extension of New Street Station, and the improvement scheme adopted by the Corporation of Birmingham, under the Artisans' Dwellings Act, have done away with many of these hotbeds of disease and vice, and brought about the demolition of scores of insanitary and utterly inadequate dwellings. The proportion, therefore, is nothing like that mentioned above, though the evil conditions of the 'homes' of the poor in places yet untouched are in many instances only intensified by the very means employed for lessening the evil. For while whole districts have been cleared off the face of the earth, provision has not been made—or at least to anything like an adequate extent—for the proper and decent housing of the people thus driven out. Some of the vilest rookeries, where whole families herded together with the most sickening disregard of the common decencies of life, have been pulled down, but of the people who inhabited them, while the workhouse has opened its doors to a few, and others have sought healthier quarters where light and air may invigorate their wasted forms and quicken their stunted intellects, the great proportion are to be found located in neighbourhoods that were already more than sufficiently occupied. One of the borough officials, to whom a question was put on this subject, is reported to have replied, 'Well, if you ask me whether there is as much overcrowding in the poorest districts as might have been seen some years ago, I must say "yes," and, in fact, more in some parts. The fact is that some of the poorest of them, on being turned out of their dirty and uninhabitable dwellings, have not sufficient money to take a house for themselves, so they take up their abode with relatives or friends. Thus we often find in one house the father and mother, a married son or daughter, and perhaps some children.' Another prolific source of overcrowding is the necessity for the parents to be abroad during the day earning a livelihood. To enable them to do this the children of two or three families are taken charge of by a neighbour, so that for the greater part of a week, perhaps, a number of grimy urchins are crowded together in a dark, unwholesome dwelling. At the same time this is often the least of two evils, and illustrates the readiness with which even the poorest and lowest of the poor will trouble and inconvenience themselves to lend a helping hand to others. Some of the courts are a disgrace to this, as they would be to any other town, excelling in filth and wretchedness in some instances even the vilest places to be found in the Black Country, and that some of these are about as vile and wretched as could possibly be anyone acquainted with the Gornal, Sedgley, Bilston, and Tipton districts is well aware. A writer in the *Mail*, a Birmingham evening paper, describing a visit to some of the slums of the town, characterises as the parts of Birmingham where the worst domestic evils of the labouring classes are observable the area bounded by Park Street, Fazeley Street, the River Rea, and Digbeth, that which includes Coleman Street, Lord Street, Adam Street, and Richard Street, the lower part of Livery Street and its environs, Slaney Street and Weaman Street, and the neighbourhood of Hospital Street. These are simply represented as some of the worst areas of the town, and by no means indicate the whole of such neighbourhoods. There are dozens of courts within half a mile of the Bull Ring, containing a score or so of houses, in which it is dangerous for the uninitiated to walk after dark, so insecure is the footing and so sparse the gas-lights. In one court, which is about three feet wide, the houses along one side are faced by a blank wall, black with the smoke and dirt of years, which effectually shuts out every ray of light and almost every breath of air. These courts are filled with tenements—one room below and two above, inhabited chiefly by hawkers, shoeblacks, loafers about the markets, and the poorest description of labourers. It is by no means exceptional to find a whole family occupying but one of these rooms, and without chair or table. And the evil, bad enough of itself, is intensified by the system of hiring several of these old and dilapidated dwellings, putting in a bit or two of furniture, and then letting the rooms at four or five shillings per week. For one of the results of turning people out of houses in condemned areas is that, whereas previously they might have had a house to themselves, however small and unfit for residence, they have then perforce, in some cases, to be content with a single room. Did space permit, some sad stories might be told of scenes from real life enacted in the poorer and more crowded parts of Birmingham. Now the authorities have awakened to the serious aspect of this fruitful source of demoralisation, disease, and crime, it is to be hoped they will not hold their hands until they have, and more effectually than hitherto, done something to better the condition of things we have attempted, in so slight and cursory a manner, to describe.

The state of things now existing was thus alluded to in a discussion on the subject at the December meeting of the Town Council. Mr. Councillor Bagnall, in supporting a resolution for the appointment of a special committee to obtain information on the subject, is reported to have said:

'The poor people had been allowed to go on rotting for about fifteen years. (Oh, oh!) They had been allowed to go on rotting while the Improvement Committee had spent 1,500,000*l.* in pulling down dwellings and buying valuable properties in the middle of the town without erecting a single artisan's dwelling on the site. It had been emphatically denied that the Improvement Committee had bought houses and repaired them, and that they had then been let for the purpose of brothels. But a case was tried in the police-court a short time ago, when it was clearly proved that a number of houses in Red Cross Street had been renovated and let, and were actually being used as brothels.' (No, no.)

The committee to whom the work has been given of inquiring into the whole state and condition of the poor of the town have commenced operations, and have called upon the Health Committee to furnish them with a report showing the number of void houses in the borough, the houses that have insufficient ventilation and cubic space for the number of occupants, or are in such a condition as to be incapable of being made healthful and proper dwellings by the expenditure of any reasonable amount in repairs, to what extent houses are let to lodgers, and the number of families taken in. The close personal inspection which will be necessary to furnish such a report, with the facts and statistics that should be got together, will, while perhaps startling those engaged in the work, or to whom the results become known, prove the most sure and beneficial means of remedying the worst of the evils complained of.

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TY YEARS OF HOUSEHOLD FFRAGE IN MANCHESTER; IN LATION TO ITS SANITATION.*

By HENRY DUNCKLEY.

Editor of the *Manchester Examiner and Times.*

CHESTER began its municipal career in 1838, a charter of incorporation was granted, but owers exercised by pre-existing bodies were ully transferred to the corporation till 1842, at this survey extends over a space of one years. The town was divided by the r into fifteen wards, to each of which, with xception, three councillors and one alderman assigned. The exception was New Cross , then much the largest, on which account it llowed a double share of representation, six illors and two aldermen. Apart from this ion, the wards are far from being 'equal elec- listricts.' Oxford Ward has 1,274 voters, St. el's 8,247. These are the extremes; but are great inequalities among the rest. esult is that one-fourth of the council lected by one-tenth of the voters; or, t it in another way, one-fourth of the , or nearly so, elect half the council. The l party has had a majority in the council from ginning, but politics do not play a prominent here. The right men are made aldermen ective of party connection as vacancies occur hen their turn comes, and they are almost re-elected when their term of office expires. is thus a permanent body within the council. ourth of the members might almost be styled iators, if the words were not a trifle too grand. nual election of the mayor is conducted with lous decorum. The question is never debated y. An informal meeting is held a couple of s beforehand, and a vote taken, when the un- sful candidate, if there happen to be more ne, withdraws or is withdrawn, the minority ver to the majority, and the new mayor comes unanimous vote.

is the machinery by which the business of wn is done; let us now see what and how as been accomplished. Manchester came in r confused condition out of the hands of the f the manor and the police commissioners. hing had to be begun from the beginning. had to be widened, new thoroughfares to be l up, and the whole town had to be sewered ved. All this may be understood. The work ne on systematically, and it is hardly an ex- tion to say that the town has been rebuilt. w corporation had first to turn their attention water supply. They bought up the Manchester lford Waterworks Company for half a million, nt for a larger supply to Derbyshire, twenty way. Their reservoirs now cover 854 acres, drainage ground in one district alone of 30 miles. All the world knows that they have Thirlmere, but this is with a view to future The total cost of the works they have con- d Is 3,352,000*l.* They are bound by Act of nent to supply other townships. The length as laid down is 643 miles, the population sup- 900,000, and the quantity of the daily supply 000 gallons, or about twenty gallons per head per day all the year round. The water is of the purest quality, and it is brought into every house in Manchester, or—to cover a small and diminishing class of old dwellings—close to them. Next to water the chief requisite is light. The corporation supplies gas to the whole of the town and to the adjacent districts. A fair price is charged, and the profits are paid over to a town improvement fund. The price has been steadily reduced. In 1841 it was 6*s.* per 1,000; its present price within the town is 2*s.* 8*d.* Gas is laid into every house, and is supplied to 74,000 consumers, over an area of 42 square miles. The works represent a capital of 1,000,000*l.*, and a product of 12,000,000 cubic feet per day. Up to the present time the sum paid over out of profits for improvement purposes amounts to 1,400,000*l.* Out of this fund the cost of making new streets has for the most part been defrayed. The lighting of the town is provided for before profits are reckoned, and may be said to cost the ratepayers nothing.

Next take sanitary work. At the date of incorporation there were no fewer than 14,000 cellar dwellings in Manchester. These have been gradually closed, till now there are not more than twenty. They are occupied by old people, and will be closed when they leave or die out. There are still 11,000 'back-to-back' houses in the older parts, that is, houses consisting of at least a couple of rooms, but with no passage through. None have been built for the last twenty years, probably not since the incorporation of the town, and none are allowed to be built. The plans of all new houses have to be submitted to the authorities, and it is required by the by-laws that each house shall have its own yard, dry closet, and dust-bin. The latter are all covered in and ventilated, ventilating shafts being run up to the top of the house in the case of all the older sort of 'cottage property.' This great change has been effected within the last few years. By recent street improvements and the enlargement or construction of railway stations a very large number of the worst class of dwellings have been cleared away. No special provision has been made for the families dislodged. Private enterprise, chiefly by means of building societies, has more than met the demand for new houses. The average number of persons per house for the city of Manchester is 5·05; in 1871 it was 5·33. How to dispose of the nightsoil and refuse is a critical business in all large towns. Within the last ten years the corporation have abolished 60,000 of the old class of yard closets. Dry ash closets have been substituted, the contents of which are removed on an average twice a week. Last year half the nightsoil, say 100,000 tons, was sold to farmers; the other half was manufactured into 7,000 tons of 'concentrated manure' and 9,368 tons of mortar. This latter is of splendid quality. It 'sets' as hard as granite. All private slaughter-houses have been suppressed. An abattoir has been provided by the corporation for the use of the butchers. The proof of the efficacy of these measures is furnished by the death-rate. It is not so low as we could wish, but it is diminishing. In 1868 it was 32·5 per thousand; in 1880 it was 24·7. So lately as 1875 it was 28·5. The diminution may be ascribed in a great measure to the sanitary improvements just mentioned. The corporation largely contribute to the maintenance of a hospital for infectious diseases. It is situated a few miles from the town, and patients are sent there who cannot be treated with a due regard to isolation

*bridged from the *Pall Mall Gazette* of Dec. 12, 1883.

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at their homes. A by-law requires that every case of infectious disease shall at once be notified to the officer of health. Two public cemeteries have been provided by the corporation, one for the north, the other for the southern districts of the city, the latter 100 acres in extent.

We come now to the provision which has been made for the recreation and instruction of the people. In 1846 a movement began for the establishment of public parks. The public subscribed 32,000*l.*, the Government added 3,000*l.*, and three parks were opened, two of them in Manchester, the other in Salford, though this is much nearer the centre of Manchester than the other two. Alexandra Park has since been purchased and laid out by the corporation at a cost of 80,000*l.* The area of the parks is about 126 acres. It is not much as compared with some towns; but the land has all been bought, no part of it having been bequeathed to us from other times in the shape of waste or common. Each of the parks has its special features, and no expense is spared in making them attractive. The spring and autumn displays of flower-beds in Alexandra Park may challenge comparison with the finest in the country, whether public or private. Besides the parks, which it should be said are provided with separate gymnasia for boys and girls, some half-dozen recreation grounds have been opened in the more populous districts. The parks and grounds are maintained out of the rates at a cost of 10,400*l.* a year. The corporation have established four public baths: they are heated in winter to summer temperature. A women's swimming bath is attached to each.

Salford has four parks and several 'open spaces,' containing altogether 115 acres. The cost of maintaining these institutions is covered by a rate of 3*d.* in the pound.

VENTILATION OF THE HOSPITAL SHIP 'CASTALIA.'—The Local Government Board have approved the adoption by the Metropolitan Asylums Board of Messrs. Robert Boyle & Son's Patent Self-acting Air Pump Ventilators for the ventilation of the twinship *Castalia*, which, having been acquired by the Board, is being converted into a Small-pox Hospital. This is one of the largest ventilating contracts that Messrs. Boyle have yet undertaken, there being twenty Air Pump Ventilators 6 feet in diameter, and sixteen 3 feet diameter, included in their contract, which comprises all the necessary shafting, fixing, &c. The Air Pump Ventilators are also being applied to the transport steamers attached to the *Castalia*. Messrs. Boyle are at present executing a large navy contract for the Dutch Government; their patent ventilators, upcast and downcast, supplied for the ironclads, being made wholly of copper.

M. BALLAND, in the *Journal de Pharmacie et de Chimie*, gives a neat and easy method for examining water contaminated by the drainage of cesspools. Into a long tube he pours a few cubic centimetres of a solution of sodium hypobromide, and then fills it completely with the water to be examined. Placing the thumb on the tube, it is inverted and placed in a glass containing mercury. If urea is present, bubbles of nitrogen gradually rise in the tube and collect at the closed end.

A PARLIAMENTARY return has been published showing that 154 urban sanitary authorities in England and Wales, of which 36 are municipal boroughs, which had in 1881 a population of over 10,000, returned no members to Parliament. 52 of these had a population of over 20,000. The largest unrepresented urban sanitary authority is West Ham, with 128,000 inhabitants; and the largest unrepresented municipal borough is Croydon, which has 78,000.

THE HOUSING OF THE POOR IN PARIS.*

FOR many years the question of the housing of the Paris poor has been forcing itself upon public attention; and it is now under the consideration of the Municipal Council. The problem differs from that of the housing of the London poor, inasmuch as Paris is confined within a belt of fortifications; and the difficulty is further enhanced by the absence of a metropolitan railway. On the other hand, the customs of building lofty houses, and of living in flats, simplify matters, so far as the economy of space is concerned. In spite, however, of these obvious differences, the position of affairs in both capitals is similar in many respects; and there can be no doubt that the experience acquired in Paris will prove useful to those who seek to attenuate the grievance in London.

In the old Paris of thirty or forty years ago rich and poor often lived under the same roof. The Haussmannisation of Paris has, however, altered all this; the magnificent houses built on the new boulevards gave no shelter to the workmen who constructed them. These latter became more and more numerous, but the houses in which they might have found lodging apartments rapidly disappeared. The greater the amount of building done the greater was the flock of workmen, who hastened from all parts to Paris, augmenting by their presence and by the destruction of the old and cheaper houses the difficulty of finding accommodation at a suitable price.

Overcrowding is the natural result, and the number of persons compelled to content themselves with furnished lodgings has been multiplied out of all proportion with the general movement of the population. Thus in 1875 there were 9,297 lodging-houses, containing 113,987 French and 18,656 foreign lodgers. In 1883 there were 11,753 houses, with 196,229 French and 43,935 foreign tenants. During the same period the population of Paris grew from, roughly speaking, 2,000,000 to 2,300,000. Thus we find the general increase of the population amounted to 15 per cent., and that of the population of furnished lodgings to 80 per cent., while that of the houses let out in furnished lodgings was only 20 per cent.

The overcrowding which these figures represent has told on the health of Paris to an appalling extent. Thus Dr. Brouardel shows that the mortality has risen from 1870 to 1883 in the following ratio:—The deaths per 100,000 inhabitants due to typhoid fever have increased from 48 to 96, to diphtheria from 53 to 101, to small-pox from 11 to 74, to measles from 30 to 43, and to scarlet fever from 7 to 18. The general health of Paris may be fairly good, but those diseases specially attributable to overcrowding and bad sanitation have more than doubled in intensity.

In the face of these facts, all parties have agreed that something must be done, though this unanimity is at once destroyed when any definite proposal is brought forward. A special committee of the Municipal Council was appointed to report on the various projects put forward, and concluded in favour of what is known as the Crédit Foncier scheme. The Council did not, however, confirm this decision, but demanded that other methods of dealing with the difficulty should be more carefully studied and

* Reprinted from the *Times* of December 25, 1883.

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another report presented. This will be no easy task, for there have been no less than 650 schemes submitted to the Municipal Council. Fortunately, a great number of these proposals are but plans for the economical building of houses, while others, though emanating from different sources, are so much alike that they can be grouped together. A few of the better known schemes are worth describing, as indicating the various currents of thought on this important matter.

M. Manier, a member of the Municipal Council, has made at least the boldest suggestion, for he proposes two measures equally difficult—first, the nationalisation of all Paris, and secondly, the payment of full and adequate compensation. This would be done by issuing a decree of expropriation for public purposes, as in the building of railways, &c., and by paying the landlords the value of their land in obligations bearing 5 per cent. interest, and amortisable in ninety years. During these ninety years the landlord may retain control over the land by paying a rent equal to the interest of the obligations he will have received, *plus* 1-16 per cent. to cover the cost of amortisation. But the houses standing on the land are still to remain private property, and it is no easy matter to separate the one from the other, particularly in France, where, more than in England, the two frequently belong to one and the same person. Nevertheless, the idea of nationalisation is so popular among the masses, that a commission was appointed to study M. Manier's scheme.

It was then ascertained that Paris consisted of 7,802 hectares, from which, if the space taken by roads, public gardens, canals, rivers, public buildings, &c., be deducted, there remains 4,755 hectares available for dwellings. The value of this land, estimated according to the average of the sales effected from 1869 to 1878, would be 6,409,056,729f., which is equal to an average rate of 135f. 53c. per square mètre. This is admitted, however, by all parties to be below the actual value of the land, which is put down at 225f. the mètre by the Commission, or a round sum of 10,800,000,000f., and at 10,400,000,000f. by M. Yves Guyot. Thus the operation proposed by M. Manier involves a sum of ten milliards, or twice the amount of the war indemnity paid to Germany.

The responsibility of such a transaction cannot be assumed lightly, particularly as there would be no immediate advantage. The landlords, feeling that their property was doomed, would probably increase the rents, and ultimately the town would become, as a feudal lord, the holder of the land, while those who made it produce would be but tenants, thus repeating, in France, the evils of the leasehold system, which are so often denounced in England. A vast number of complications would arise, and ultimately the town might find itself compelled to purchase the houses, as well as the land. Then it would be necessary to nominate an army of functionaries to manage this gigantic estate, and a wide field would be thrown open for peculation, for bribery, and corruption. Nor have the State tobacco monopolies, and factories, the State railways, the arsenals, or the administration of the Customs, proved that the State is a particularly good employer.

More practical and more moderate is the proposal presented by M. Joffrin, the workingman member of the Paris Municipal Council, in the name of forty-seven trades unions, thirty-seven workmen's clubs or associations, and two co-operative societies. He urges that the town should build dwellings on the land it possesses, to be let to workmen at cost price. These houses would not only serve as models, but the low rents would compete advantageously with private enterprise and facilitate a general reduction. Further, M. Joffrin argues that as there are constant attempts to rig the market by keeping apartments empty for lengthy periods, a heavy tax should be inflicted on all unutilised land and houses situated within the fortifications. This latter measure would be far the most effectual, particularly if the tax, as proposed, equalled 20 per cent. on the annual value of the property.

The competition due to the town building some houses would be limited, for it only possesses 411,751 mètres, of which the greater part is already occupied by public buildings, schools, &c. Some of the remaining land is also so narrow that no houses could be erected on it, and there are, therefore, only about 180,000 square mètres available. This space would not suffice to lodge more than 18,000 families, and the population of Paris is stated to be increasing at the rate of 50,000 per annum. But such an operation would create a useful diversion and relieve the actual pressure. In any case, the proposal of the Possibilist party, as presented by their representative, M. Joffrin, is far more feasible that that of the Impossibilists, who, according to their leader, M. Jules Guesde, simply wish to impose a tax of 50 per cent. on all house and land owners. Of course this would naturally drive away capital, and the position of the workmen would be worse than before.

M. Martin Nadaud, M. Yves Guyot, and many others have urged that the fortifications, being antiquated, and no longer an effective means of resistance against modern artillery, could safely be removed and the land used for building purposes. This would certainly make an immense difference, as the fortifications, measuring 142 mètres in width and 33,105 mètres in length, cover an area of 4,709,400 mètres, to which could be added the military zone, which is 250 mètres wide, and equals in all about 8,500,000 square mètres. Thus the town would find itself possessed of 13,500,000 mètres of good building ground. Speculators were already moving in this matter, lands in the immediate neighbourhood were bought, and preparations made for great operations directly the fortifications should be condemned. A deputation waited on General Cam penon; who, however, had been inspired directly by the Socialist party, and consequently replied that in any case the Government could not sanction the sale of the land on which the fortifications stood, for it would be necessary to reserve this source of income for State purposes.

A great number of plans involve conditions similar to those laid down in the Crédit Foncier scheme. The first principle involved is that of relieving from taxation houses especially built for workmen. It is calculated that the material required to build a small workman's cottage or house, worth 200*l.*, pays 12*l.* duty on entering Paris, while the taxes for the building and maintaining of the street (*Voirie* and *Viabilité*) amount together to 28*l.* The taxes are, therefore, equal to a fifth of the total cost of the cottage. But if a large house were built of the value of about 4,000*l.*, the taxes would only be equal to about 8½ per cent. Thus the desire to build small dwellings, so that the workman may be the sole master of his own house, is discouraged by the method of taxation as well as by the dearness of the

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land. On the other hand, speculators, dreading the difficulty of collecting a large number of small rents, prefer high-class houses. The Crédit Foncier, moreover, has shown itself more ready to make advances to the owners of this description of property.

It has, therefore, been thought necessary to offer special inducements for the building of workmen's cottages or of large houses where at least half the available space shall be let out in small apartments not exceeding the yearly rental of 12*l.* The first inducement suggested is the remission of the taxes which, as shown above, are of so onerous a description; and the second, that the town should guarantee the interest of at least a portion of the money employed in building workmen's dwellings. But by reducing the revenue of the town customs all the poor would be called upon to pay part of the rent of the few among them who succeeded in getting rooms in the new houses; for it is on the poor that the *octroi* duties weigh most heavily, and what was taken off the building materials would be imposed upon some object of more general consumption. Again, the guarantee by the town of the interest of capital is denounced as State socialism; though, when applied to the Crédit Foncier, it was qualified by M. Joffrin as State favouritism. The object was to benefit the workmen; and yet not a single workman's society has approved of the project, while M. Gamard, the Royalist municipal councillor, showed, with a few telling figures, how the scheme would work.

If a house was worth 225,000f., the Crédit Foncier would lend 65 per cent., or 165,000f., and the town would remit taxes to the extent of 8 per cent., or 20,000f.; total—185,000f. To build a house worth 225,000f., it would only be necessary to disburse 70,000f.; but if this were the speculation of a builder, his 12 per cent. of profits, or 30,000f., might be further deducted. Thus the outlay would only be 40,000f.; and for this sum a house worth 225,000f. could be acquired. If the house brought in 6 per cent., which is a moderate estimate, this would be an income of 15,000f., out of which 8,000f. must be paid to the Crédit Foncier; and there remains an annuity of 7,500f., which equals 18 per cent. on 40,000f., or some 10 per cent. on the outlay, if the proprietor be not himself a builder. The responsibility of guaranteeing the interest on the 2,000,000*l.*, which the Crédit Foncier proposed to raise could scarcely be imposed upon the State, for the probable benefit of builders, speculators, and capitalists, when the sole object the Legislature had in view was to help workmen, who could not pay more, or even as much as 12*l.* a year rent. Thus the Credit Foncier scheme, though elaborately prepared, and powerfully supported, fell through; but the question remains, whether any fragment of the plan can still be rescued, and applied differently.

In the meanwhile any number of stirring appeals have been made to the spirit of individual initiative, which, however, remains dormant. The example of the Artisans' Dwellings Company of London is quoted in vain. The *familliste`re* of Guise, the workmen's dwellings at Mulhausen (see SANITARY RECORD for December 15, 1883, page 309), at Lille, Amiens, Rheims, and other places—all these and other precedents are brought forward; but apparently the public persists in looking to the State for the solution of the problem. This, however, is no easy matter, though plans for raising the money are not wanting. M. Le Rouge, for instance, argues that as it is the great rush of foreigners and provincials to Paris which has created the difficulty, a tax of 2f. should be imposed on all persons coming from a greater distance than twelve miles. As this tax might be paid by the railway companies, its collection would not involve any outlay, and it is calculated to yield 740,000*l.* annually. With this new source of income the town could easily obtain advances, so as to commence building operations at once.

M. Lalanne advocates the piercing of new thoroughfares, to be no less than 70 mètres wide, so that the town may have space to build on either side, and thus obtain increased revenues. Others want to organise lotteries, or to impose by moral pressure a tax of 10f. on employers for every person they employ; and M. Levaud, the Municipal Councillor, demands that apartments now rented at 40*l.* or 50*l.* per annum should be divided off into five or six little apartments, let at from 10*l.* to 12*l.* each. But M. Songeon, who represents in the Municipal Council the ideas of the group of Socialists who have rallied to M. Clémenceau's standard, maintained that the first step was to alter the method of taxation; and that no local and empiric remedy could cure a constitutional malady. Finally, there are some thinkers who argue that action should be directed to the country districts, and not to Paris. The greater the improvements of Paris, the greater the number of persons who will desert their native fields and villages to come and live in the capital. If Paris is complaining of overcrowding, the provinces are equally aggrieved by the depopulation of the rural districts. A law that could make the land more remunerative to the cultivator would soon relieve the large towns.

Such are a few of the arguments which the present controversy has brought to the surface. If as yet no solution has been attained, the grievance has been well ventilated; and those politicians who imagine that the State can, whether in Paris or in London, by a few strokes of the pen, put an end to all social troubles have had an ample opportunity of learning in the course of the discussion that evils which it has taken generations to create cannot be removed in a day.

A recently published work on workmen's dwellings in Paris, has also led to a discussion at the Institute, in the course of which M. Léon Say pointed out that measures for closing insalubrious dwellings would be futile till new dwellings were supplied to take their place. He was not sanguine as to the adequacy of State interference, which had not been productive of any important results in England; and he had more confidence in private building societies as a means of remedying the evil. Such societies already existed at Pantin and Auteuil, and it was to be hoped their number would increase. M. P. Leroy-Beaulieu pointed out that the building societies in existence in Paris built houses of from 5,000f. to 6,000f. in value, which required yearly returns for their purchase exceeding what the tenants of unhealthy dwellings were able to afford.

THE President of the Local Government Board has appointed Mr. George Pownall as the first arbitrator under Torrens's Act, in consequence of the Marylebone authorities being called upon to purchase under the provisions of that measure. (See p. 341)

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HINTS TO SANITARY INSPECTORS.

(*Continued from page* 249.)

CHAPTER IV.—(*Continued.*)

FAULTS OF DRAINAGE IN HOUSES.

§ 30. *Disconnection of Rain-Water Pipes.*

IT will now be necessary to consider for a short space of time the various other forms of disconnection which should obtain in a properly treated house. No house can be considered in a perfect sanitary condition, even if the house-drain be disconnected from the sewer after the manner shown on p. 248, unless everything else be disconnected as well, that is to say, made to deliver in the open air. The only exception to this rule should be the soil pipe, the soil that traverses which should not be kept in any trap but, on the contrary, be rapidly carried to the sewer.

The most serious consequences have been known to result from the connection of rain-water pipes with the drain at the foot, because, given a drain which is not disconnected from the sewer and has no inlet of fresh air into the drain, with a corresponding outlet at a ventilating pipe, then the pipe, despite its opening at the top, is continually filled with foul air, which cannot escape, for lack of a current. Fig. 9 shows exactly how a rain-water pipe should be treated. The foot of the pipe should deliver over a gulley as shown at A, and the top may or may not have a rain-water head as shown at C. It is of little consequence, as a rule, whether the foot of the rain-water pipe at B should deliver by a shoe over the gulley grating, or whether it be led underneath the gulley grating and deliver directly over the trapping water of the gulley. Where it is possible, the rain-water pipe should perhaps deliver over the gulley grating. Still, this is sometimes objectionable when the pipe leads down from a high roof, and would be apt to splutter around the gulley. In the figure the gulley is set with the grating and dish-cover above the ground line, which is always found best when there is a surrounding of earth.

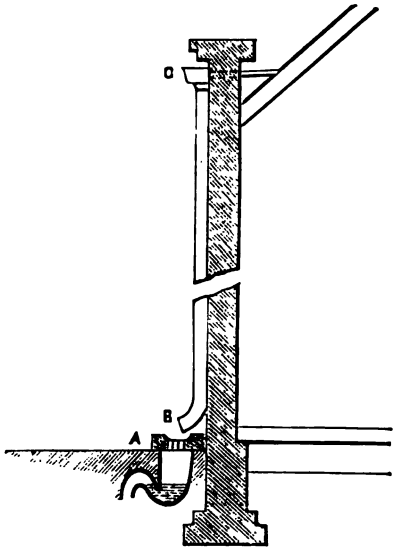

FIG. 9.

Of course in court-yards, when the surface water of the yard has to be led away, the dish-cover can be sunk a little under the line of the yard paving.

§ 31. *Disconnection of Sinks.*

It is very seldom that the inspector of nuisances will find the sinks treated in a proper manner. He may find them with their wastes delivering directly into the drain inside the house without a proper trap underneath them, the trap being formed by dipping the end of the waste-pipe into the water of a small mason's trap or cesspit. In consequence of this treatment the smell given off in the neighbourhood of the basement sinks will be continually complained of. Very often the sink is trapped only by a bell trap, which is removed at pleasure, often broken and seldom replaced until the room has been stormed by sewer gases or drain air.

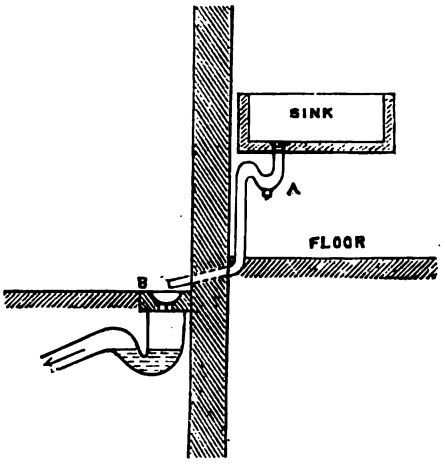

FIG. 10.

Fig. 10 illustrates the proper method of dealing with a basement sink. In all cases the sink should be led to deliver in the open air of some yard or area, even if it be necessary to take a separate drain from such sink, twin-fashion, alongside the ordinary drain. It will rarely, if ever, happen that it is impossible to lead the waste-pipe of a sink to the open air, and everything should be studied in order to bring about this desirable delivery. The end of the waste-pipe can deliver over or under the gulley grating, as explained under the head of rain-water pipes; but the delivery over the gulley is mostly preferable. The only objection to the delivery under the grating is that sometimes pieces of food are apt to lie on the top of the grating and give the area an untidy appearance. In order to prevent the slight effluvium, which is always more or less generated in the gulley, from reaching the interior of the room, it is always wise to fix a syphon trap with an access plate under the sink. This will also keep out the cold air.

It sometimes happens that a sink becomes necessary at the far end of a basement where there is no back yard or central yard, and when objection is taken to the expense which would have to be incurred were a twin drain to be laid down to the front area. In such a case as this, the waste of the sink should deliver all the same into a gulley, but not a gulley with an open grating, owing to the fact that the gulley would be inside the house, and an open flow-trap would be a great objection. Here it

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would be well to cover the grating over with a piece of slate, for example, which can easily be replaced, and bed it down in cement. But if this method of delivery be resorted to, it would be essential that the closed gulley B should be ventilated by a small pipe to the outer air, in case the trap should be stormed at any time, and in order to remove any smell given off by the contents of the trap. Of course, the trap A underneath the sink, which, by the way, should never take the form of a D trap, must nevertheless be retained, whether the gulley be open or closed.

The inspector of nuisances will very often find sinks provided in housekeepers' rooms, butlers' bedrooms, and servants' halls, where they have been long disused, and, if the removal of these sinks is objected to, it should be his special care to see that they are treated in proper fashion—that is, as shown at fig. 10. The mere plugging up of a sink-waste is not sufficient when a sink has to be thrown out of use, unless the waste-pipe be severed at the ground line, and the entry into the drain thoroughly abolished.

§ 32. *Disconnection of Scullery Sinks.*

The questions which the inspector would have to decide with regard to scullery sinks would be whether they should deliver in the open air, or whether they should be built in connection with a grease chamber. There will always be different opinions about the desirability of grease chambers. Whilst they are in no way desirable in cottages or small houses, they may nevertheless become positive necessities in large town and country mansions. In the latter the grease chamber is intended not only to intercept the fats, but is also meant to act as a place of deposit for the many bushels of sand which are washed down the sink when the scullerymaids are scouring the cooking utensils. As a general rule liquid fats will not travel more than ten feet down a drain before congelation takes place, and here they are apt to clog the drain. When the sand factor is added to the obstruction, the case may become a very serious one and necessitate the opening up of the drain.

For small houses with an ordinary cook-maid it may be taken for granted that the most desirable

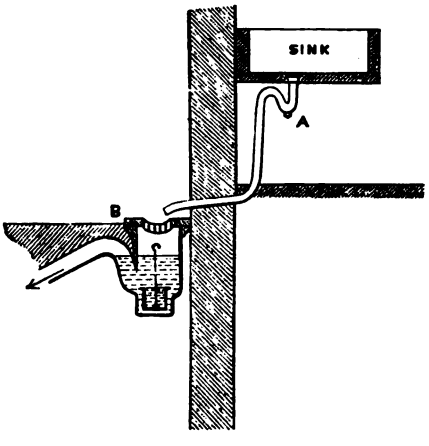

Fig. 11.

method of dealing with the scullery sink is that shown at fig. 11. Here a gulley is used with an open grating, and in many cases an ordinary gulley will suffice. The best kind of trap, however, to use is that known as Deane's trap, which is shown at fig. 11 at B. This is an ordinary gulley, as far as trapping goes; but it is fitted up inside with a lifting box for the reception of silt and grease, and when this is full it is cleaned and replaced in the gulley. Of course such a trap cannot properly be fixed inside the house, nor should any trap be fixed inside the house, although it is only too common to find them there. It has been customary in former times to fix bell-traps and other traps underneath the scullery sink, so that when the scullery floor is swilled out, the water is thereby removed. Such traps, however, should never be allowed, and should be immediately removed.

The question often arises, especially in small town houses built in streets where there is no back yard, what should be done with the scullery sink delivery? Is it possible to cause the waste of the scullery sink to deliver over a properly built gulley fixed underneath the sink? Is this system of disconnection a safe one? All that can be said in reply to these questions is that if the house drain be properly disconnected from the sewer, a current of fresh air be kept constantly traversing it and proper flushing provided to the closets, such an open delivery might be permitted, provided that it was attended to daily and the trap kept clean. It would be far preferable, however, to have the gulley covered over with a slate as before described, and a ventilating pipe

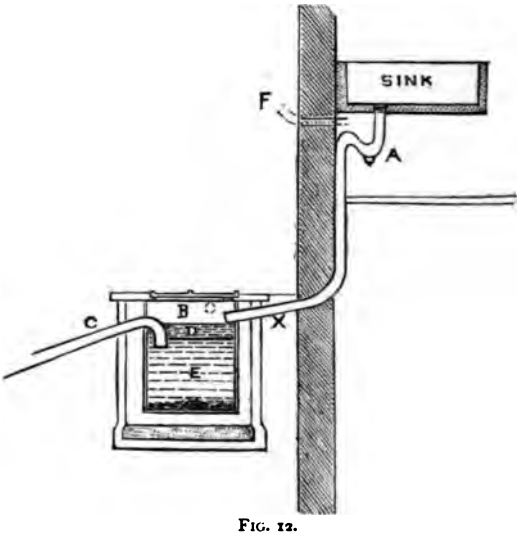

Fig. 12.

taken to the outer air from the box of the gulley. Sometimes it is also necessary to ventilate the siphon A underneath the sink, especially when large quantities of boiling water are poured away, as this steam otherwise saturates the water and gives off a smell in the neighbourhood of the sink. If it be decided to build a grease collection chamber, where also the sand can be deposited and periodically removed with the fat, the chamber should take the form shown at fig. 12. Any other kind of built-up trap, such as those formed with a dip-stone after the manner of a Mason's trap, will not be found so satisfactory in use. There should always be the usual access trap under the sink, and this should deliver over the water of the grease-chamber, and not dip into it. It is common enough to dip the end of the waste-pipe into the trapping water, in order to save the expense of a trap under-

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neath the sink itself; but the practice is not a commendable one. It would be preferable to fix the lead-trap in the usual way, and ventilate close to the trap, so as to keep the pipe as relieved as possible. The outgo of the trap should be by a bent pipe: a 4-inch stoneware quarter-bend will be generally found best, as shown at C.

The most common mistake made in dealing with scullery sinks is to make the waste pipe of too small a sectional area. It should never be less than 2 inches, and need not be more than 3 inches in diameter; and when this pipe is of lead, if it has to run underground for any distance, it should be laid inside a small earthenware pipe, in order to keep off rats. At least, this is the best practice, for rats very readily gnaw the lead wastes.

Whenever such a trap as this must be provided in a large establishment for reasons aforesaid, and when there is no out-door place to build it in, it must be perforce inside the house, under the scullery sink. But in that case the chamber must be thoroughly ventilated, say by a pipe taken from B to the outer air, where there would be no chance of smells blowing into the open windows.

A 1½-inch pipe would be sufficiently large. When, happily, the grease chamber can be fixed outside the house, it is sometimes desirable to allow the scullery sink waste-pipe to deliver over a Doulton gulley before delivering into the chamber. This would be an extra precaution. Whether the grease chamber be inside the house or outside, it is desirable to ventilate it. The cover for these chambers should be of iron, of an air-tight pattern, which will allow of an easy inspection.

It is not desirable to fix stone covers, as these are generally broken when the contents of the chamber are removed, and moreover entail much expense in men's time and material. It would be the duty of the inspector of nuisances, when examining a house, to see whether such a trap has been provided, for it is not an uncommon thing to find that a grease chamber has been provided by the builder, but has never been cleaned out, thus making matters worse than if no chamber had been provided at all. These receptacles should be emptied whenever they are provided every two months or so, and more than three months should never elapse without their being attended to.

In conclusion, grease traps should never be resorted to unless they are absolutely indispensable. It would be safer to take a little risk without them than build them, or allow them to remain in an old house, where they are not positive necessities.

§ 33. *Disconnection of Lavatories, Baths, &c.*

In these, above all places, perfect disconnection should be provided. Taking the bath for example, it can be treated as shown at fig. 13. The bottom of the waste-pipe, D, should always deliver in an open yard or area over a gulley, such as that drawn when describing sinks. It is a very common practice to cause the waste-pipes of baths and lavatories to deliver into an open rain-water head placed, for instance, at E, and to this there can be no great objection, provided this rain-water head be not immediately under a window. When bath water is emptied down an open head of this description, the decomposed fats of soap are apt to line the inside of the pipe with slime, and this would give off a bad odour. The better way would be to continue the waste-pipe, D, to above the eaves, or to some suitable level, as shown by the dotted line, F, thus ventilating the pipe completely, and obtaining a

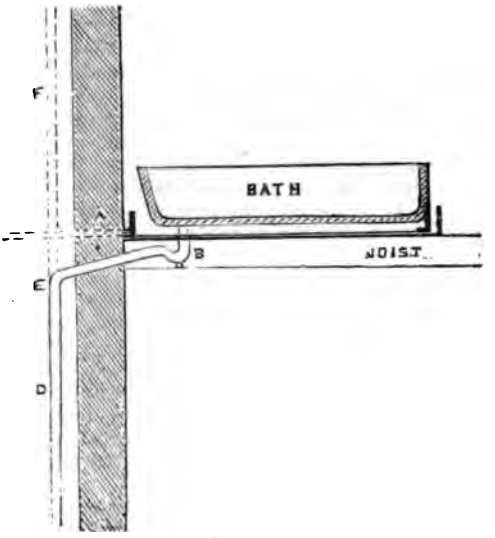

FIG. 13.

constant current of air through it. The waste should be trapped underneath the sink, as shown, and the best way of dealing with the waste of the lead safe or tray would be to take it through the wall, as shown at A. It can, however, be otherwise dealt with. There can be no objection to using rain-water pipes for the delivery of the bath wastes, provided that these are not open too near a window. Indeed, rain-water pipes will be found to be the most economical method of removing the contents of baths and lavatories, especially in small houses.

(To be continued.)

THE Dudley Board of Guardians, after a thirteen weeks' trial of a weekly fish dinner for the workhouse inmates, find that it has resulted in a saving of 36*l.* 9*s.* 2*d.*

A PUBLIC meeting has been held in Glasgow to promote the establishment of more day nurseries. It was stated that out of 14,000 annual deaths, 2,000, or one-seventh of the whole, were deaths of children not three months old. There are 13,000 women householders in Glasgow, and from three-fourths to two-thirds of these support themselves. These figures indicated the great amount of good work that might be done by day nurseries in saving infant life and rearing children under more wholesome conditions. Resolutions were passed and committees appointed in furtherance of the object of the meeting.

AT a recent meeting of the National Health Society, was decided to assist as far as possible the useful work now being carried on in several parts of London by the Sanitary Aid Committee. The National Health Society will issue shortly a handbook for the use of sanitary aid visitors, explaining in simple terms the existing laws concerning tenants and landlords; the leaflets and pamphlets already published by the Society will also be found of great service.

THE tables in the fourth volume of the General Census Report show that there are thirteen English counties in which population is declining. In Cornwall the decline in the last decade even reaches nearly 8½ per cent. In Huntingdonshire it has been but a fraction less, while in Radnorshire the falling off has been 6⅞ths per cent. In all other counties there has been an increase, amounting in the case of Middlesex (outside the metropolitan boundaries) to nearly 43½ per cent.

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ENGLISH URBAN MORTALITY IN 1883.

By J. HAMPDEN SHOVELLER.

IN an accompanying table will be found summarised the vital and mortal statistics issued by the Registrar-General in his weekly returns for 1883, relating to twenty-eight of the largest English towns. Monthly and quarterly summaries of these statistics have already been published in these columns.

The 297,921 births registered in the twenty-eight towns during the year 1883 were equal to an annual rate of 34·7 per 1,000 of their estimated aggregate population in the middle of that year, which was rather more than eight and a half millions of persons. The birth-rate did not exceed 33·9 in London, while it averaged 35·3 in the twenty-seven provincial towns. The birth-rate in these large towns has steadily and continuously declined each year since 1876, when it was as high as 38·1 per 1,000. The lowest birth-rates in the twenty-eight towns were 29·0 in Halifax, and 29·2 both in Brighton and in Bradford; the highest were 39·2 in Cardiff, 39·5 in Nottingham, and 41·9 in Sunderland.

The 185,347 deaths in the twenty-eight towns last year were equal to an annual rate of 21·6 per 1,000 of the population, which was lower than that recorded in any previous year for which similar statistics are available. The recent improvement in the health of the country, judged by that of the large towns, has been more than maintained during the past year. During the ten years 1871–80 the death-rate in the large towns dealt with by the Registrar-General averaged 24·0 per 1,000. During the past three years of the current decade 1881–3 this rate of mortality has not exceeded 22·2 per 1,000, which implies that upwards of 50,000 persons in these towns have survived during the last three years who would have died had the death-rate of 1871-80 since prevailed. It may be noted that the *Lancet* estimates the saving of life in England and Wales during the past three years at 214,000, as the result of the reduction of the death-rate from that which prevailed during the thirty-five years 1840–75, which it attributes to the operation of the Public Health Acts of 1872 and 1875. The death-rate in London last year was equal to 20·4 per 1·000; while in the twenty-seven provincial towns it averaged 22·5. The rates ranged in these towns from 17·9 in Bristol, 18·1 in Derby, and 18·3 in Bradford, to 25·5 in Newcastle-upon-Tyne and in Preston, 26·7 in Liverpool, and 27 6 in Manchester.

During 1883, 24,529 deaths were referred to the principal zymotic diseases in these twenty-eight towns, equal to 13·2 per cent. of the deaths from all causes, and to a rate of 2·9 per 1,000. This zymotic rate in the preceding ten years 1873–82 averaged 3·9 per 1,000. The lowest zymotic death-rates during last year were 1·0 both in Norwich and in Halifax, and 1·2 in Bristol, while the highest were 4·3 in Preston and in Newcastle-upon-Tyne, and 4·5 in Liverpool. During the year 1883, 6,665 deaths were referred to diarrhœa in the twenty-eight towns, equal to an annual rate of 0·75 per 1,000; this was a lower rate than has been recorded in any year since 1879, and considerably below the average in the ten years 1873-82. After diarrhœa scarlet fever caused a larger number of deaths than any other of the zymotic diseases; the 4,878 deaths attributed to scarlet fever were equal to a rate of

Analysis of the Vital and Mortal Statistics of the Twenty-eight Great Towns, dealt with in the Registrar-General's Weekly Returns, for the Year 1883.

Towns.	Estimated Population middle of 1883.	Births.	Deaths.	Annual Rate per 1,000 Living. Births.	Deaths.	Principal Zymotic Diseases.	Deaths from Principal Zymotic Diseases.	Small-pox.	Measles.	Scarlet Fever.	Diphtheria.	Whooping-cough.	Fever.	Diarrhœa.	Rate per cent. of Uncertified Deaths.	Deaths of Children under one year of age to 1,000 births.
28 Towns	8,620,975	297,921	185,347	34·7	21·6	2·9	24,529	414	4,292	4,878	1,387	3,922	2,971	6,665	2·6	156
27 Towns	4,665,161	164,265	104,769	35·3	22·	2·9	13,723	280	1,872	2,889	436	2,343	1,890	4,021	3·6	164
London	3,955,814	133,656	80,578	33·7	20·	2·7	10,801	134	2,420	1,989	951	1582	1,081	2,644	1·2	146
Brighton	111,262	3,237	2,131	29·2	19·2	2·3	255	—	54	11	4	60	28	98	2·8	146
Portsmouth	131,478	4,631	2,438	35·3	18·6	2·2	292	1	10	17	22	56	99	87	0·9	138
Norwich	89,612	3,046	1,734	31·1	19·7	1·0	90	—	7	3	5	17	10	48	3·1	150
Plymouth	74,977	2,354	1,553	31·5	20·9	2·1	157	—	26	—	12	61	23	35	0·8	152
Bristol	212,779	6,839	3,795	32·3	17·9	2·2	261	—	35	34	20	39	36	97	3·0	133
Wolverhampton	77,557	2,804	1,644	36·3	21·3	1·6	125	7	—	23	4	20	15	57	6·8	146
Birmingham	414,846	14,716	8,824	35·6	21·3	3·1	1,285	110	153	321	48	177	76	400	1·1	160
Leicester	129,483	4,787	2,503	37·1	9·4	2·4	304	—	14	66	6	59	12	147	2·8	189
Nottingham	199,349	7,846	4,224	39·5	21·3	2·1	424	2	14	59	31	76	71	168	2·4	164
Derby	85,574	3,067	1,543	36·0	18·1	·5	134	1	22	17	1	32	19	40	2·1	143
Birkenhead	88,700	3,130	1,756	35·4	19·9	·8	112	—	37	22	2	30	29	42	2·9	146
Liverpool	566,733	19,907	15,074	35·2	26·7	4·5	2,536	26	618	388	51	395	540	518	5·4	185
Bolton	107,862	3,720	2,331	34·6	21·7	2·2	242	—	2	6	6	34	30	162	2·5	174
Manchester	339,252	12,157	9,344	36·0	27·6	3·6	1,225	1	255	237	29	248	86	349	2·4	177
Salford	190,465	6,778	4,254	35·7	22·4	·3	633	—	155	81	22	101	73	201	4·7	171
Oldham	119,071	4,185	2,611	35·3	22·0	·5	179	2	6	21	8	38	26	78	6·6	159
Blackburn	108,460	4,228	2,648	39·1	24·5	·8	304	--	3	52	—	32	95	121	2·9	173
Preston	98,564	3,751	2,503	38·2	25·5	4·3	413	--	3	64	14	30	56	252	5·1	210
Huddersfield	84,701	2,495	1,798	29·6	21·3	1·7	140	—	31	7	2	43	17	38	4·4	175
Halifax	75,591	2,187	1,510	29·0	20·0	1·0	78	—	2	10	4	10	30	22	9·6	147
Bradford	204,807	5,961	3,743	29·2	18·3	1·5	301	—	22	35	6	71	53	14	3·0	146
Leeds	321,611	11,118	7,454	34·7	23·3	4·0	1,299	11	12	672	43	157	123	28	3·1	166
Sheffield	295,497	10,812	6,755	36·7	22·9	4·0	1,171	2	142	461	20	173	97	276	4·6	163
Hull	176,296	6,458	4,006	36·8	22·8	3·2	562	7	12	77	21	247	63	135	5·4	171
Sunderland	121,117	5,054	2,962	41·9	24·5	2·5	302	50	16	33	19	19	74	89	4·3	134
Newcastle-on-Tyne	140,464	5,478	3,792	36·8	25·5	4·3	644	59	208	123	11	54	76	114	3·6	197
Cardiff	90,033	3,519	1,813	39·2	20·2	2·3	227	1	11	43	22	61	32	57	1·9	153

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0·57 per 1,000, which, though slightly above the rate in these towns in the preceding year, was considerably below the average rate in the ten previous years. The greatest fatality of scarlet fever during last year occurred in Sheffield and Leeds. The 4,292 deaths from measles showed a considerable decline from those recorded during 1882, and were equal to a rate of 0·50 per 1,000, which was slightly below the average rate in the ten years 1873–82; the highest death-rates from this disease were recorded in Newcastle-upon-Tyne and Liverpool. The fatal cases of whooping-cough in the twenty-eight towns, which had been as many as 7,600 in 1882, declined to 3,922 during 1883, and were equal to a rate of 0·46 per 1,000, against an average of 0·75 in the ten preceding years; the highest rates last year were returned in Cardiff, Manchester, and Hull. The death-rate from 'fever' (principally enteric) in the twenty-eight towns was equal to 0·35 per 1,000, and was slightly lower than that recorded in 1882, and considerably below the average rate in the ten years 1873–82, which was 0·43 per 1,000. The fever death-rate in London did not exceed 0·27 per 1,000, whereas it was equal to 0·41 in the twenty-seven provincial towns, it was 0·76 in Portsmouth, 0·89 in Blackburn, and 0·96 in Liverpool. The 1,387 deaths attributed to diphtheria exceeded the number in 1882: this disease was more than twice as fatal in London as in the provincial towns. During last year 414 fatal cases of small-pox were registered in the twenty-eight towns, against 675 in the previous year; 134 occurred in London, and 280 in the provincial towns, of which 110 were recorded in Birmingham, 59 in Newcastle-upon-Tyne, 50 in Sunderland, 26 in Liverpool, and 11 in Leeds. The fatality of small-pox in London showed the greatest excess during the early part of the year, after which it steadily declined until the middle of November, since when it has somewhat rapidly increased. The number of small-pox patients under treatment at the Metropolitan Asylum Hospitals, which was 101 at the end of January, declined gradually to 34 in the middle of November, but at the end of the year the number had risen to 98.

Infant mortality, measured by the proportion of deaths under one year of age to births registered, averaged 156 per 1,000 in the twenty-eight towns last year. It was equal to 146 in London, and averaged 164 in the twenty-seven provincial towns, among which it ranged from 133 in Bristol, 134 in Sunderland, and 138 in Portsmouth, to 185 in Liverpool, 189 in Leicester, and 210 in Preston.

THE American Public Health Association was organised in 1872, largely through the efforts of Dr. Stephen Smith, of New York, having, at its organisation, scarcely forty members. It has had enrolled during the ten years of its existence over seven hundred members, and now numbers probably five hundred members.

HULL GENERAL INFIRMARY.—This building is to be entirely remodelled, and to have two new wings added to it in accordance with the plans prepared by Messrs. H. Saxon Snell & Son, architects, of London, who are the architects of several of the largest parish hospitals in the metropolis, including the new St. Marylebone Infirmary at Notting Hill, opened last year by H.R.H. the Prince and Princess of Wales. The senior member of the firm is known as the author of 'Charitable and Parochial Establishments,' and, jointly with Dr. Mouat, of 'Hospital Construction and Management,' now in course of publication.

ON COPPER IN FOOD.

BY GUSTAV BISCHOF.

THE notes by Mr. Kingzett on the above subject in the December number of the SANITARY RECORD are of considerable interest, but I am doubtful whether some of the conclusions, which he apparently invites, can be accepted, without reserve. Copper and lead are amongst the most convenient metals for a variety of manufacturing operations. They are thus largely used in the preparation of a great many articles of diet, and if we accept Dr. Giunti's account of the cupric oxide in Blatta orientalis, we cannot be surprised that one or the other of these metallic poisons may frequently be detected in such foods.

As regards Dr. B. H. Paul's and Mr. Kingzett's experiments on the action of copper on the human system, they would have been more conclusive had they been continued for seven weeks or months, instead of for seven days only. But taking it for granted that a large proportion of the copper has been shown by the experiments to be eliminated from the system, the question after all remains, what is the action of the copper, which is not eliminated? Possibly this may do no harm, however many tinned foods containing copper or lead ore are taken year after year, but this is just the point, which is most difficult to settle definitively. It may have a different action upon different constitutions, and even should it be demonstrated that copper in such foods as preserved peas is harmless, a further and perhaps more important question will have to be raised. A variety of preparations, which are intended to serve as substitutes for mother's milk, are given to infants more or less as their sole food. Supposing these contain minute quantities of a metallic poison, might those infants not suffer more seriously than adults, who take preserved peas amongst a variety of other food?

Manufacturers should, therefore, not draw the conclusion from Mr. Kingzett's notes (which certainly was not intended by him) that it is immaterial whether or not preserved peas and other articles of diet contain a metallic poison. They should, on the contrary, in their own interest do all in their power to prepare those foods, which have become such an important and indispensable industry, as pure as possible by substituting, as far as practicable, pure tin for lead and copper thickly coated with pure tin for copper only. To enable them to test their preparations, I will, in concluding, state that I am in the habit of first determining in the incinerated and otherwise condensed sample the precipitate obtained by sulphuretted hydrogen colorometrically. The precipitate is then dissolved by a few drops of nitric acid, washed into a small porcelain crucible, evaporated to dryness, and heated gently. After cooling, one drop of sulphuric acid and two or three of distilled water are added, when two platinum wires, connected with a galvanic battery, are passed into the liquid. This affords an exceedingly delicate way of qualitatively confirming the nature of the precipitate, as the film deposited on the point of the negative wire may even be examined under a magnifying glass. It is, perhaps, not unnecessary to remark that the purity of all reagents employed must be rigorously tested by blank experiments.

MR. MARK H. JUDGE, A.R.I.B.A., has been elected on the Health Committee of the Social Science Association, Adam Street, Adelphi.

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THE
SANITARY RECORD.
JANUARY 15, 1884.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

EARTH-BURIAL *v.* CREMATION.

So much has been written, even by the adherents of ordinary interment, on the dangers to health arising from the proximity of graveyards to human habitations, that it would be well to inquire how far these dangers are real or imaginary, and preventible or not. This Dr. Hinsch has attempted to do in a paper read last March before a Hygienic Congress at Hamburg, and now published in the *Centralblatt für Allgem. Gesundheitspflege.* After referring to the several forms of furnace employed for cremation, and classifying the cremations that have already been performed in different countries, he proceeds to discuss the question *pro* and *con.* As to the reported cases of persons having died, or been struck by disease after descending into vaults, and of lights being extinguished by the gases evolved therein, he gives it as his opinion that either the vaults were ill-constructed and arranged like those in the burial-ground for the poor at Naples, than which he admits nothing could be more horrible,* or that the gases were simply the carbonic acid which everywhere forms so large a proportion of ground air even in the absence of such a mass of decomposition as is here assumed, and which may be drawn into a vault from the surrounding soil, although the cells containing the coffins are securely cemented up. This is admitted by Küchenmeister, the most strenuous advocate of cremation.

Against mere burial in the earth the objections appear at first sight more plausible. The gases evolved in putrefaction are carbonic acid and various hydrocarbons, ammonia, and compounds of sulphur and phosphorus with hydrogen; but Pettenkofer failed to detect any of these in the air of cemeteries, and Fleck was equally unsuccessful in discovering products of decomposition in air drawn by an aspirator direct from the soil of the graves. If they do escape, the fault lies in the mode of burial, not in earth-burial itself; and he adduces several instances in support of his allegation.

The pollution of wells and springs by the rise and fall of the ground water among the graves is no doubt possible, but can be easily obviated in light soils by proper drainage, keeping it at a constantly low level; while in stiff clays no such circulation takes place, and decomposition is extremely slow. Besides, we must not forget the power possessed by pervious soils of destroying the products of putrefaction, as shown in the earth-closet; and the fact that Fleck, Wiebel, and others, who have examined the waters in the proximity of cemeteries, have failed to find any evidence of pollution.

* There twenty to thirty corpses are daily interred in vaults, often either naked or wrapped only in rags, and lightly covered with earth.

As to the communication of fevers by germs retaining their vitality in the soil, he is utterly incredulous, and quotes the evidence of Dr. Holland, the English medical inspector of graveyards, of Hofmann and Pettenkofer, to prove that such dangers have no real existence, and that the alleged cases of the prevalence of disease in the neighbourhood of cemeteries have been invariably traced to foul ditches, cesspools, and similar causes.

The economic aspect of the rival modes he treats fairly and fully, urging that while the question does not enter into that of permissive cremation, compulsory cremation would demand in the end nearly as much space for the urns as earth-burial, with re-employment of the same ground after a term of years, does now. Nor can the cost be taken into account one way or the other, for while only the wealthy would avail themselves of permissive cremation, the expense would be greatly reduced if ever it were universal and obligatory. He rejects the objections urged against cremation as precluding exhumation for medico-legal examinations, since such a resort is a confession of the miscarriage of justice or of erroneous diagnosis, which might be provided against by the special precautions adopted in Italy when the parties elect cremation; and as to the sentimental question much may be said on both sides. There is no need to contemplate the buried horrors of putrefaction and the worm, while those of cremation are not wholly concealed from view, and there is a pathetic poetry around the grass or flower covered grave to which no marble *columbarium* can lay claim.

The general conclusions to be drawn from Dr. Hinsch's paper seem to be that, while overcrowded burial-grounds and badly arranged vaults are open to serious objections, there are really none to cemeteries well drained and to properly constructed vaults on the cell-system; that the air of graveyards does not differ from that of other places; and that in general the alleged dangers are, if not imaginary, the result of gross neglect and easily preventible. Of course the subsoil water may become polluted if the earth be taxed beyond its powers or drainage be neglected, but these circumstances are not to be deemed necessary attendants of earth-burial.

THE Tipton Local Board of Health have agreed to the purchase of a piece of land at a cost of 1,450*l.*, for the purposes of outfall works in connection with a scheme of sewerage they have recently adopted.

THE LOWER THAMES VALLEY MAIN SEWERAGE.—At a recent meeting of the Lower Thames Valley Main Sewerage Board at Kingston, the special committee appointed to select a site for the pumping station at Molesey reported that they had secured six acres of suitable land from the agents of Mr. H. Speer, of Thames Ditton, for 1,800*l.* The chairman and other members of the board having commended this as a judicious selection, the price being considered very moderate, the board unanimously agreed to authorise the completion of the purchase when the preliminaries were settled. The chairman, Sir Thomas Nelson, then congratulated the board upon having made a beginning at last, and stated that though the committee had not yet received a reply from the owners of the land which it was sought to acquire for the carrying out of the works at Mortlake, he regarded this in a favourable sense, having no doubt that the owners were giving the matter due consideration. A communication was received from the Local Government Board, enclosing a memorial from the Mortlake Vestry, against the drainage scheme adopted by the board.

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NOTES OF THE MONTH.

POISONING BY PERIWINKLES.

SOME months since the daily press contained a striking account of the death of a man from eating periwinkles. The case, which occurred at Finchley, is made the subject of special comment by Dr. James Turle in a recent report on the district. The person attacked was a baker, aged twenty-eight, who, up to the time of eating the periwinkles (about a handful) had been in perfect health; but was attacked within four hours with excruciating pain and sickness, and died in thirty ours. A systematic inquiry was made at every house in the neighbourhood, and in this way six persons were discovered who had purchased some of the same batch of periwinkles. On further inquiry Dr. Turle found that one pint was eaten by a young man, who pronounced them to be 'very good'; another pint, except some rejected as 'not good,' by a man and a boy; a third pint was eaten by three children, part thrown away as not good; a fourth was eaten by a man (without ill effect) and a woman, the latter awaking four hours afterwards with intense pain and diarrhœa, which continued until she took an emetic. A fifth pint was eaten by a woman and two boys, followed in the case of one boy by no effect; but in the case of the other boy and the woman by pain and diarrhœa. The sixth pint was thrown away as not being good, after only three had been eaten. Dr. Turle went to the salesman at Billingsgate, but was unable to obtain any satisfactory information. It is well known, however, that bad shell-fish are often sold at that market with a small quantity of good ones on the top. The periwinkles on the evening in question were being sold at half their usual price, and the probabilities are in favour of some having been in a state of decomposition.

SANITARY BROADSHEETS.

A REMARKABLY clear and concise pamphlet has been issued by Dr. T. Orme Dudfield, setting out the measures to be adopted on the appearance of infectious disease. It states in simple language the general directions which should be followed in cases of illness, and explains the easiest and best methods of disinfection. Attention is drawn to the necessity of the frequent removal of house refuse, and of care being exercised in regard to water-cisterns, closets, drains, and the like. Dr. T. W. Iliff, of Newington, has also issued a revise of a placard of practical hints in cases of infectious disease, which follows closely the excellent model prepared by the Society of Medical Officers of Health. The distribution of pamphlets of this kind should do much towards familiarising householders with the first steps to be taken on the appearance of disease, and, consequently, towards preventing the unnecessary spread of infection.

PROPOSED NEW CATTLE MARKET FOR BIRMINGHAM.

THE Corporation of Birmingham have for some time past been in negotiation with the London and North-Western Railway Company respecting the purchase of thirteen or fourteen acres of land belonging to the company, for the purposes of a cattle-market, abattoirs, cattle-pens, lairs, and other buildings. It has long been considered that the driving of cattle through the streets, which in some places are very narrow, and which are generally in daytime crowded with vehicles and pedestrians, is a dangerous as well as an obstructive practice. And from a sanitary point of view it is certainly desirable that slaughtering should be done away from the town and under the most perfect sanitary arrangements possible. It is estimated that the cost would be something like 70,000*l.*, the site costing nearly 20,000*l.* Considerable opposition, however, has been raised to the scheme by butchers and cattle salesmen in the town, who allege that the site chosen is inconvenient and unsuitable, that it had not been shown the present market at Smithfield is insufficient for the requirements, that the shifting of the site will not prevent the driving of cattle through the streets, and that, to make the new market in any way effective, the three railway companies—the London and North-Western, the Midland, and the Great Western—must have equal access to it. The matter came on for discussion at the December meeting of the Town Council, when a resolution was moved and seconded for the adoption of the scheme. Ultimately the matter was adjourned until communications had been made to the respective railway companies.

THE HOMES OF THE BILSTON POOR.

SOME attention has been aroused as to the conditions under which some of the poorer inhabitants of the township of Bilston are housed, in consequence of some rather severe strictures passed upon the sanitary condition of the place, and the manner in which the Board of Commissioners discharge their duty in reference thereto; by Mr. W. H. Phillips, the coroner for the district. The inquiry at which these strictures were made was respecting the death of a girl, four years of age, who was found to have died from the effects of pneumonia, caused by cold and damp. Dr. Mathie, who attended the case, stated that the house in which the deceased had lived was one of the most insanitary he had ever seen, and that the people could not live in a better place to get the effects of sewer-gas unless they lived in the closet itself. In the same house another child was suffering from 'drainage' throat, caused by the inhalation of impure air; several persons were ill in the same building, one being a child suffering from scarlet fever, and a man had died there the previous day, making three deaths in the property within a week. Nothing would make the house habitable, and it ought to be pulled down. Upon this the coroner remarked that there was a large number of inhabited dwellings in Bilston which were injurious to health, and in which he would not keep an animal he cared for. He was most anxious to stir up the feelings of the authorities, with a view to their taking action in the matter. But they seemed to be very lax in dealing with such property, and, unless the recommendations he made were better attended to, he should certainly ask the Local Government Board to send down an inspector to inquire into the disgraceful sanitary condition of the township. This matter came before the Commissioners at their last monthly meeting, at which the death-rate was reported to be 27·19 per 1,000, seven of the deaths being from zymotic diseases. Dr. Larkin, the Chairman of the Board, characterised the case as an 'extraordinary mare's nest.' He had visited the premises in question, and must say that he regarded the medical

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evidence given at the inquest as being unscientific and unguarded. It was not a matter of surprise that children should die of pneumonia, and the medical officer informed him there had been thirty-five deaths from that cause during the year, not by any means confined to one locality or to small houses. As to the evidence about sewer-gas and drainage throat, Dr. Mathie may have thought the sewers went near the house, whereas they were a furlong away. The closets were also some yards from the house, at the back and front of which was a stretch of open country. Probably a hundred persons, mostly children, died in Bilston from diseases caused by cold and damp. But he was at a loss to know how any medical man could attribute pneumonia to the dampness in the house in question; it was not half so great as that caused by the water thrown upon the 'quarries' when the women cleaned the floors of their houses. He had no doubt that the statements made would tend to stir up the medical officer and the inspector of nuisances, but the facts had certainly been exaggerated to the last degree.

HOW TO LIVE RENT FREE.

CONSEQUENT upon reports which had been made by the medical officer and surveyor to the Wandsworth Board of Works with reference to a number of old and dilapidated houses, the Board ordered certain works to be executed. The reputed owners of these houses or their agents were directed to attend on account of the work not having been carried out. In several cases no one appeared, but in others some women attended, all of whom said that they paid no rent. Mrs. Boucher said she had been in her house sixty-six years, having been born and bred there. The landlord died and left the property, since when no one had claimed any rent, so she regarded herself as the owner. Mrs. Caughkey said she was owner of the house in which she lived—that was, she did not pay any rent. Her husband was 46 years of age, and was born in the house, having lived there ever since. Mrs. Hammond said she had not paid any rent for nineteen years, and had been offered 150*l.* for her house by Messrs. Watney. Mrs. Frost, the owner of three houses, said two were empty and nailed up, whilst for the third she had paid no rent for ten months. She had no power to carry out the works which had been ordered. Mr. Sanson said the railway company were likely to take his houses, and he was waiting for a settlement. He was reminded that the railway company had not yet got their Act of Parliament, and allowed a fortnight, the other cases being adjourned for the surveyor to see what work had been done. It was then agreed to call upon all the other medical officers of the district to report as to whether there were any more houses in a similar state to which Mr. Torrens's Act could be applied. It was stated in the course of the discussion, that some of the houses dealt with had been known to change hands for a sovereign.

ALCOHOL IN BREAD.

Mr. J. W. KNIGHT writes in the *Chicago Clinical Review* that it is worth pointing out for the benefit of those that have such an unnatural abhorrence of alcohol, that all yeast-made bread contains it, and in quantities that are not altogether insignificant, for instance fresh-made bread contains 0·30 per cent. of absolute alcohol, and bread a week old from 0·12 to 0·13 per cent. In the process of fermentation a much larger quantity is produced, but to a great extent is lost by evaporation in the oven. It has been computed that the annual loss of alcohol in bread making, amounts to 300,000 gallons. Efforts have been made in large bakeries to condense and collect this alcohol, but hitherto without success. One hundred thousand dollars were spent in the fruitless endeavour to collect and condense the alcohol in the Military Bakery at Chelsea.

Now, as yeast fermented bread is the only kind of bread that can be eaten for any length of time without producing satiety, for aërated bread, although it is light, and of very agreeable flavour, quickly palls upon the appetite, and persons very soon become tired of it, is it not probable that the great superiority of bread as an article of daily consumption, compared with other farinaceous products that are not fermented is due to the presence of alcohol? It is interesting to note that a loaf of bread contains somewhere about the same quantity of alcohol as a glass of ale.

FRENCH VITAL STATISTICS FOR 1882.

FIGURES that represent the births, deaths, and marriages of the Republic for 1882 indicate that the rate of increase of the population shows no improvement on previous years, and can scarcely fail to be an object of disquietude as to the future of the nation. The number of marriages during the year was 280,460, as against 282,079 in 1881; the births were 935,566, instead of 937,057 in 1881; and the only increase was in the deaths, which were 838,539 against 828,828. At this rate France would require 267 years to double herself, as far as native population is concerned; though the actual increase is greater on account of the immigration of foreigners, which, according to the last census, would enable the country to double its population in 165 years. If we take a retrospective view (from the *Annuaire Statistique*) of the returns during this century, we shall see that France has very seriously retrograded in these particulars.

Date.	Period.	Marriages.	Births.	Deaths.	Excess of Births.	Years required for doubling.
1806–14	1st Empire .	0·81	3·12	2·62	0·50	139
1815–29	Restoration..	0·77	3·14	2·52	0·62	112
1830–47	Louis Philippe	0·83	2·85	2·41	0·44	158
1848–50	2nd Republic.	0·81	2·69	2·41	0·28	248
1851–60	2nd Empire..	0·79	2·63	2·39	0·24	289
1861–68	— —	0·80	2·65	2·30	0·35	198
1869–71	— —	0·73	2·46	2·88	0·42	165
1872–76	3rd Republic.	0·86	2·63	2·35	0·38	183
1877–81	— —	0·75	2·50	2·24	0·26	267
1882	— —	0·74	2·48	2·22	0·26	267

A JAPANESE HEALTH SOCIETY.

ONE of the latest associations of this kind which have been organised is the Japanese Society of Health of Tokio. Its objects, we learn from the *Sanitary News* of Chicago, are to spread the knowledge of hygiene and public health and to aid the sanitary efforts of the Government, by discussing and determining the best means for maintaining and improving the health of the Japanese people, and for prolonging human life. A committee for investigations is pro-

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ed, which shall study the following subjects :— olic and private health, school, prison, military, l naval hygiene, sanitary police, hygiene of occuions, hygiene of mind, medical science, pharmacy l materia medica, chemistry, protection of infant , contagious diseases, statistics, sanitary legislation, :tuation in price, demand and supply of commoes, civil engineering, industries, meteorology, ology and geography, natural history, charity, and tle epidemics. Truly a somewhat miscellaneous l comprehensive list, but perhaps the Japanese a long-lived race. The society is to have nthly meetings.

AVERAGE VALUE OF FUELS.

a practical treatise on boilers and their use, by fessor A. Smith, now in course of publication by *American Engineer*, of Chicago, a table is given 'variations in the quality of fuel,' or in their porative power. Below are some of these rage and comparative values of best samples of l :

Pure carbon	15
Dry charcoal	14
Good dry coke	14
Anthracite coal	15·3
Dry peat	10
Dry bituminous coal	15·9
Coking ,, ,,	16
Dry pitch pine	10
Mineral oils, about	22·6

Professor Smith also states that the refuse from best soft coals is from 3 to 10 per cent., and from hracite 10 to 20.

INSURANCE OF INFANTS' LIVES.

: read in the *Insurance Post* a report by a comtee of the Halifax Charity Organisation Society, ich states that in sixty-two families, 102 children e died under the age of five, whose lives were ured in sums amounting in the aggregate to over *l.* In one family ten children, all insured, died, the urance money received by the parents amounting gether to 20*l.* In another family seven, in two er families five, in two others four, whose lives e insured in various amounts, died. In none of sixty cases referred to do the committee find t the father has insured his own life or joined club for the benefit of his family in case of sicks or death. It is only too probable, says our temporary, that a little one is sometimes neged, it being known that the result will be a uniary benefit; thus there is an inducement to mit a crime for which the direst poverty can r no excuse.

A WELL MERITED TRIBUTE.

MEETING of the Whitechapel District Board of rks was specially convened on the 27th ult. to conr the proposal that, upon Dr. Liddle, the medical cer of the district, resigning his office, an annual wance, amounting to twenty-eight sixtieths of present salary, or 325*l.*, be granted to him by the rd, and that such allowance be charged to the ds of the board in the manner directed by the visions of the 29th Vict., cap. 31, with regard to erannuations. Colonel Munro, in moving the ption of this, referred to the long, honourable, faithful service Dr. Liddle had rendered to the rict. Mr. Nicholson, as a member of the board from 1855, heartily seconded the motion. The chairman (Mr. Gladding) said they were all conscious that the work done by Dr. Liddle had never been done perfunctorily, but was performed out of his deep concern for the public health and welfare. In addition, therefore, to the formal resolution now before them, he thought the board would join in a special resolution expressive of the warm feelings of honour and respect entertained for their old friend and coadjutor. The formal resolution of superannuation was unanimously adopted, and, in addition, the clerk was asked to draw up the special personal testimony suggested by the chairman.

NOTIFICATION OF INFECTIOUS DISEASES.

WITH regard to the working of the clause in the Edinburgh Police Act, requiring practitioners to notify to the medical officer for the city all cases of infectious disease, the following figures are interesting. In 1883, 5,411 intimations of such cases were sent in. Of these nearly 3,000 were cases of measles, and 1,817 were of scarlatina, which, like the former disease, has been epidemic in the city. There were also intimated 214 cases of diphtheria, 346 of typhoid fever, and 50 of typhus fever. During the half-year just ended the sum payable to medical practitioners for intimations of infectious disease—2*s.* 6*d.* being the sum paid for each intimation—amounts to 481*l.* 7*s.* 6*d.*

A FRESH ELEMENT.

A DEPUTATION from the Southwark (Farm House) Committee on the Dwellings of the Poor, headed by the chairman, Mr. Berry, recently waited upon Mr. Arthur Cohen, M.P., on the subject of furthering legislation with a view of obtaining compensation for weekly tenants of properties required for public improvements. The deputation explained that the poor, ejected *en masse* from neighbourhoods which they had inhabited for years, and generally contiguous to their places of labour, were driven away and put to expense, while the small property holder —whose tenants they were—or equally small leaseholders, were compensated at the expense of the public. After a long conference, it was arranged that Mr. Cohen should draft a Compensation Bill and introduce it into Parliament in the coming session. The main provisions of the Bill are to be that weekly tenants shall be compensated in accordance with the duration of their tenancy, and that for the purposes of inquiry and assessment a Board of Commissioners, consisting of three members and holding office for three years, shall be constituted, with the power to assess the measure of compensation, without any right of appeal against their decision. The latter provision is proposed to be inserted to prevent litigation.

MORTUARIES.

IN consequence of a scandal which arose some months ago at Wednesbury in connection with the body of a drowned person which, while awaiting in the outbuilding of a beershop the coroner's inquest, was partly consumed by rats, an outcry was made for the erection of a mortuary. The Local Board for Wednesbury took the matter up with promptitude, put up a satisfactory building, and at the same time, at the coroner's request, granted him the use of the board-room at the town-hall for the holding of inquests.

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ISOLATION HOSPITALS.

For some months past small-pox has been prevalent in the unions of Durham, Sedgefield, and Bishop Auckland, being particularly virulent at Tudhoe and Croxdall Collieries, and also at Spennymoor. Several public meetings have been held at which the various sanitary defects of the district were pointed out with a view to a remedy. The greatest difficulty the medical officers have to contend with is the utter want of facilities for the proper isolation of parents, who are principally residents in colliery-houses, which are mostly destitute of many desirable conveniences. An effort is being made to establish a hospital for infectious diseases at Spennymoor. At a meeting held at Low Spennymoor, on the 7th ult., it was stated that there were twenty-seven cases in the township of Tudhoe and twelve cases in the Sedgefield Union. Pressure has been brought to bear upon the West Bromwich Town Council with the object of removing as speedily as possible a temporary hospital taken by them during the recent small-pox epidemic for the isolation of cases of infectious disease. The principal reason urged for the removal is that the building is too near an inhabited district, and affords insufficient protection to the inhabitants, two or three patients having escaped while in a state of delirium, and one having been found in the yard of a public-house wrapped only in a blanket. The Corporation have secured a site for a permanent infectious diseases hospital adjacent to the cemetery, and, at their meeting on the 2nd inst., the Council agreed to the sealing of a contract for the erection of the building.

THE PUBLIC HEALTH

During December 1883.

The mean temperature during last month at the Royal Observatory, Greenwich, was 40°·5; it was 1°·4 above the average December temperature in one hundred years, and exceeded that recorded in the corresponding month of either of the two preceding years. An excess of temperature prevailed on eighteen days of the month, while on the other thirteen days it was below the average. The warmest day of the month was the 13th, when the mean was 49°·9, and showed an excess of 8°·0; the coldest day was the 6th, when the mean did not exceed 32°·0, and was as much as 10°·7 below the average. Rain was measured at Greenwich on fifteen days during the month, to the aggregate amount of 0·8·0 of an inch, which was 1·2 inches below the average December rainfall in sixty-one years. During the year 1883 the rainfall amounted to 21·9 inches, which was 3·4 inches below the average annual rainfall in sixty-one years. As one inch of rain represents a weight of water equal to one hundred tons per acre, it follows that the deficiency of rainfall during last year was equal to about 340 tons per acre. The sun was above the horizon during 242·7 hours during December, and 12·1 hours of bright sunshine were recorded at Greenwich. This amount was little more than half the average in the corresponding periods of the five years 1878–82, and was considerably less than that registered in any corresponding month on record. Westerly winds prevailed throughout the greater part of the month.

In the twenty-eight large English towns now dealt with in the Registrar-General's Weekly Return, which have an estimated population of more than eight and a half millions of persons, 20,938 births and 14,324 deaths were registered during the four weeks ending Dec. 29. The annual birth-rate, which had been 34·1 and 33·5 in the two preceding months, further declined to 31·7 during December, and was 2·2 per 1,000 below that recorded in the corresponding period of last year. The lowest birth-rates in these twenty-eight towns last month were 25·1 in Brighton, 25·9 in Plymouth, 26·0 in Bradford, and 26·4 in Halifax; the rates ranged upwards in the other towns to 35·9 in Newcastle-upon-Tyne, 36·6 in Cardiff, 37·0 in Sheffield, and 39·3 in Nottingham. In London the birth-rate last month was 30·7, whereas in the provincial towns it averaged 32·5.

The annual death-rate in the twenty-eight towns, which had been 19·5, 19·7, and 22·6 in the three preceding months, declined to 21·7 during the four weeks of December, and was considerably below that recorded in these towns in the corresponding period either of 1881 or 1882, when it was 24·1 and 25·7 per 1,000 respectively. The lowest annual rate of mortality last month in these towns was 16·2 in Bradford. The rates in the other towns, ranged in order from the lowest, were as follow:—Portsmouth, 17·0; Bristol, 17·2; Hull, 18·4; Wolverhampton, 19·7; Oldham, 20·0; Cardiff. 20·6; Nottingham, 20·7; Leicester, 20·7; Sunderland, 20·7; Sheffield, 21·1; Plymouth, 21·1; London, 21·3; Bolton, 21·4; Norwich, 21·5; Birmingham, 21·8; Salford, 21·9; Huddersfield, 22·2; Halifax, 22·4; Derby, 22·6; Blackburn, 22·8; Birkenhead, 23·1; Leeds, 23·7; Brighton, 23·8; Liverpool, 24·5; Newcastle-upon-Tyne, 24·9; Manchester, 26·8; and the highest rate during the month, 28·1 in Preston. While the death-rate in London during December was 21·3 per 1,000, it averaged 22·0 in the twenty-seven provincial towns. The 14,324 deaths from all causes in the twenty-eight towns during the four weeks of December included 469 which were referred to scarlet fever, 458 to measles, 310 to whooping-cough, 246 to 'fever' (principally enteric), 136 to diphtheria, 125 to diarrhœa, and 46 to small-pox. In all, 1,790, or 12·5 per cent. of the total deaths, resulted from these principal zymotic diseases, equal to an annual rate of 2·7 per 1,000. This zymotic death-rate showed a slight decline from that recorded in the two preceding months, and was somewhat below that which prevailed in the last month of 1882. The death-rate in London from the principal zymotic diseases was equal to 2·7 per 1,000 during December, and corresponded with the average rate in the twenty-seven provincial towns, among which it ranged from 0·2 in Halifax, 0 6 in Norwich, and 0·8 in Wolverhampton, to 4·2 in Newcastle-upon-Tyne, 4·3 in Leeds, and 4·7 in Manchester. Scarlet fever caused the high zymotic death-rate in Newcastle-upon-Tyne and in Leeds, and measles in Manchester.

Scarlet fever was again the most fatal zymotic disease in the twenty-eight large towns during the month under review. The rate of mortality from this disease in these towns, which had steadily increased in the seven preceding months from 0·36 to 0·84, declined during the last month of 1883 to 0·71; in the corresponding periods of 1881 and 1882 the death-rates from scarlet fever in these towns were 0·87 and 0·61 respectively. No fatal case of this disease was recorded last month in Portsmouth, Plymouth, Bolton, Oldham, Huddersfield, or Halifax; in the other towns the rates of mortality from scarlet fever ranged upwards to 1·3 in Leicester, 1·4 in Sheffield, 2·4 in Sunderland, and 3·1 in Leeds. In the last-mentioned town no less than 279 deaths have resulted from scarlet fever during the last three months of 1883. The death-rate from measles, which had increased from 0·28 to 0·56 in the three previous months, further rose to 0·69 in December last; in London the rate of mortality from this disease was 0·67, and was very slightly lower than the average rate in the twenty-seven provincial towns, among which it was equal to 2·1 in Derby and in Manchester, 2·2 in Birkenhead, and 2·6 in Salford. The rate of mortality from whooping-cough, though it showed a further increase upon that which prevailed in the two preceding months, was considerably below the rates recorded in the corresponding months of 1881 and 1882. In London the death-rate from whooping-cough was 0·57 per 1,000,

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while in the provincial towns it did not exceed 0·38, but was equal to 1·4 in Huddersfield, and 1·5 in Brighton, The death-rate from 'fever' (principally enteric), which in the two preceding months had been 0·37 and 0·46, declined again to 0·37 per 1,000, and was considerably below that recorded in the last month of 1882; in London the fever death-rate was 0·36, and slightly below the average rate in the twenty-seven provincial towns, among which it was equal to 1·2 in Blackburn, and 1·3 in Preston. The rate of mortality from diarrhœa was below the average of recent corresponding periods. The death-rate from diphtheria showed a slight further increase upon the rates recorded in the four preceding months; this disease was proportionately more than twice as fatal in London as in the provincial towns. During the four weeks of December 46 deaths from small-pox were registered in the twenty-eight towns; of these, 14 occurred in Birmingham, 13 in London, 10 in Sunderland, and 9 in Liverpool. During the last six months of 1883 no less than 94 fatal cases of small-pox have occurred in Birmingham. Judged from the returns of the Metropolitan Asylums Hospitals, the prevalence of small-pox in London showed a considerable increase; the number of small-pox patients under treatment in these hospitals, which had been 41 and 49 at the end of the two preceding months, rose to 98 at the end of the year, a higher number than has been returned in any month since the end of January last. The average weekly number of new cases admitted to these hospitals, which in the two previous months had been 7 and 12, rose to 23 during December.

The rate of infant mortality in the twenty-eight towns, measured by the proportion of deaths under one year of age to births registered, was equal to 159 per 1,000 during December, which was slightly below that recorded in the last month of either of the two previous years. In London the rate of infant mortality was equal to 158 per 1,000, and almost corresponded with the average rate in the twenty-seven provincial towns, among which it ranged from 100 and 114 in Portsmouth and Wolverhampton, to 203 in Halifax, 229 in Brighton, and 230 in Preston.

The death-rate from diseases of the respiratory organs, judged by the metropolitan returns, was below that recorded in the corresponding periods of recent years. The average weekly number of deaths referred to these diseases in London during December was 416, and the annual death-rate was equal to 5·5 per 1,000, against 6·0 and 7·3 in the last months of 1881 and 1882. In Liverpool last month the annual death-rate from these diseases was 5·6 per 1,000.

The causes of 384 of the deaths registered in the twenty-eight towns during the four weeks of December were not certified, either by a registered medical practitioner or by a coroner. These uncertified deaths were equal to 2·7 per cent. of the total deaths, which exceeded the proportion recorded in any month since May last. In London the percentage of uncertified deaths was only 1·3, whereas it averaged 3·8 in the twenty-seven provincial towns; all the causes of death were duly certified in Plymouth throughout the month; whereas the proportion of uncertified deaths was equal to 6·3 in Salford, 6·8 in Hull, 7·1 in Oldham, and 7·2 in Liverpool.

Among the population living in the outer ring of suburban districts around London, estimated at rather more than a million persons, the annual death-rate from all causes during December was equal to 17·9 per 1,000, against 18·7 and 20·9 in the corresponding periods of 1881 and 1882. The annual death-rate from the principal zymotic diseases in these suburban districts, which had been 1·6 and 1·9 in the two previous months, was again 1·9 in the last month of the year. During the four weeks ending the 29th ult., 39 fatal cases of scarlet fever, 32 of whooping-cough, 24 of diphtheria, 23 of 'fever,' 22 of measles, 13 of diarrhœa, and 1 of small-pox, were recorded in the outer ring. The fatality of scarlet fever, diphtheria, and whooping-cough showed an increase. Twenty deaths from scarlet fever, 14 from whooping-cough, 6 from measles, 5 from 'fever,' and 1 from small-pox, were recorded in the district of West Ham. During the month 8 fatal cases of diphtheria and 6 of measles occurred in Tottenham sub-district; and 5 deaths resulted from measles in Brentford sub-district.

SPECIAL REPORTS.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the society was held at 1 Adam Street, Adelphi, on Friday, Nov. 16, Dr. T. O. Dudfield in the chair.

The council presented the following report:—

Factory and Workshops Act, 1883.—The Council recommended that the society should adopt regulations concerning bakehouses, and stated that they had already prepared draft regulations for this purpose, which they proposed to forward to members of the society with a view to eliciting their opinions, the draft regulations to be taken into consideration at the next meeting.

Public Health (Dairies, &c.) Bill; Diseases Prevention (Metropolis) Act.—The Council deferred reporting on these for the present.

Mr. Shirley Murphy called attention to a minute of the Education Department of the Privy Council of March 6, 1882, establishing a code of regulations, and ordering that the managers of School Board Schools must comply with any notice of the sanitary authority requiring them for a specified time with a view to preventing the spread of disease, either to close the school or to exclude any scholar from attendance subject to an appeal to the department, if the managers considered the notice to be unreasonable, and stated that the London School Board had recently prohibited from attendance at school all children coming from houses in which a case of infectious disease existed.

The following gentlemen were elected members of the society:—Dr. Conway Evans, medical officer of health of the Strand district, and Mr. R. Bianchi, medical officer of health of the St. Saviour's district.

A paper, entitled 'The Water Supply of Troops in India,' was read by EDWARD NICHOLSON, S.S.C.Camb., F.C.S., F.I.C., Brigade Surgeon (Retired List) Army Medical Department, of which the following is an abstract.

Life in India is much more primitive than in the circumstances of our climate and civilisation. In the application of Western sanitary principles to India we must take account of peculiar local circumstances:—the power of the sun, the costliness of labour and machinery imported from Europe, the intense poverty of the Indian population and the cheapness of its labour.

The native portion of our Indian army does not live in barracks, in Southern India at least. The Sepoys live in 'lines,' streets of huts, the conservancy of which is effective in preventing any extensive pollution of the soil without interfering with the peculiar customs of the Indians. Water is drawn by hand from wells in the lines. It generally shows the mineral traces of pollution of the soil, but thoroughly oxidised. Disease is very rarely traceable to it.

The English troops live in barracks suited to the climate, and the sanitation of which is effected by means which are simple and in harmony with the circumstances. Our small army is set free for purely military duties by the employment of barrack native auxiliaries—scavengers, watermen, cooks, washermen, &c. All drains are surface, kept clean by sweepers. The dry-earth system is in general use, though imperfect in its details. Water is supplied from wells in or near barracks, rarely from tanks.

A description was then given of the Indian tank (a pond or lake, made by throwing a dam across the line of sur-

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face drainage), the character of the water, its general turbidity, the effect of water-plants in removing this and in purifying the water from pollution, the effect on the level of water in wells sunk above the line of the dam. The causes of pollution by the peculiar habits of the Indian population were described; customs of purification in which the original social spirit has died out, and which are now sources of public danger.

The *baoly*, or tank-well, is a well so vast as to give it the appearance of an accumulation of rain or surface water. Barrack wells are generally 10 feet to 20 feet in diameter. Pollution can scarcely ever occur from drains, but may arise from accidental dirt in the drawing of water by hand, or by imperfect mechanical means, and also in its distribution and storage.

The wells are rarely worked by pumps, which generally get out of order; and there being no competent workmen in the cantonment the various indigenous mechanical appliances are preferred.

The water is distributed generally by the watermen attached to each company. In Northern India they are called *bhistis*, and carry the water on their backs in large leathern bags; in Southern India they are called *pakhalis*; the water is there carried by a bullock in a pair of leathern bags called *pakhals*, holding thirty to thirty-five gallons.

Drinking water is always filtered in the barrack verandahs. The usual appliance was until lately the three-chatty filter; a series of three chatties (wide-mouthed globular pots of unglazed earthenware) set one over the other in a bamboo frame. The middle pot contains sand and charcoal, through which the water in the uppermost trickles (by holes in the bottom), and is received in the lowermost; into this the soldier dips his tin-pot when he requires a drink. This system is very simple, and cools the water down nearly to dew-point, but any purification is rarely effected, so much is the water exposed to dirt, and so imperfect, and often dirty, is the filtering medium.

The three-chatty filter has lately been superseded by the 'Macnamara' filter, a very imperfect form of Danchell's siphon filter, which gives unsatisfactory results.

Mr. Nicholson simplified the three-chatty filter; he reduced the chatties to two, one closing the mouth of the other. In the bottom of the upper one is a nozzle about one inch in bore and two inches long, into which a piece of sponge is packed. This can be cleaned daily. The lower pot is flat-bottomed, and fitted with a metal stop-cock, which can be shifted to a fresh pair of chatties when those in use cease to cool the water from the loss of porosity. This simple filter was highly approved by the soldiers and by the Commissariat Department, but failed to replace the official pattern.

From the diseases attributable to Indian drinking-water, goître and calculus are disallowed as unsupported by evidence. Some arise from parasitic animals. Elephantiasis is attributed to impure drinking-water, and investigation of the subject is desirable. The evidence as regards the production of malarial fevers by drinking-water is very incomplete.

Enteric fever is a main cause of fatal disease among our soldiers in India, but its extent among the Indian population is very uncertain, owing to the almost total absence of any western medical attendance for it, and consequently of any trustworthy registration of causes of death. Hence it is very difficult to trace the cause of enteric fever in soldiers. We can only say that the disease has most probably been contracted out of barracks, and that the habits of the natives whom the soldier frequents are such as to favour the propagation of enteric fever among them.

The propagation of cholera through drinking-water is generally accepted, and, though it is difficult to trace the source of an epidemic in barracks, yet the fact of its being so frequently contracted on the line of march, and of the circumstances of a march being so favourable to its communication, through polluted drinking-water, support the view strongly.

Filtration of a kind suitable to barrack life is considered ineffective in preventing infection by any of the diseases attributable to drinking-water; the boiling of water and its subsequent aeration, refrigeration, and storage, in a simple chatty-filter, was advocated.

Mr. Nicholson, at the request of Sir Frederick Haines, late Commander in-Chief of the Madras Army, undertook the construction of a filter-cart for troops on the march, and made a trial of the system by a 200-mile march with an infantry regiment along a road noted for cholera. The result was most successful, the health of the men being perfect, and the system was strongly recommended by a committee for general adoption. Mr. Nicholson, however, attributes the success less to the filters than to the facilities which the carts gave for supplying the men while marching with water of known quality, and to his care in selecting and guarding the water supply at the next camp. Under the *pakhali* system thirsty soldiers were too often supplied with water from roadside ponds likely to be polluted by travellers, and water had to be taken into use under emergency, without regard to quality. A description was given of life on the line of march, showing the difficulty of protecting the sources of water supply from pollution. A system of boiling the water in camp, as in barracks, was advocated to insure perfect safety.

After a few remarks by the President, Surgeon-General Gordon said he had spent twenty-five years in India, some of which were occupied by long marches lasting four months, and covering considerable distances, that he had served during the Indian Mutiny, and yet with all this experience of India, he had never found a case of disease directly traceable to water, always excepting those which were due to parasites. He thought more importance was attached to water as a possible source of disease than it deserved, and explained how all the ordinary marches are specifically laid down, the halting places being chosen with reference to water supply, and an officer appointed to see to the purity of this water; hence the troops always had pure water. He believed that duck-weed served a useful purpose in oxygenating water and thus purifying it. With reference to fever he thought that the differences between one fever and another were dependent rather upon the individual who suffered than upon the disease itself. Younger soldiers, for instance, would have a tendency to glandular enlargement; hence their greater tendency to lesion of the bowel.

Dr. Tripe, after referring to the generally accepted opinion that the pollution of tanks by excreta was a common cause of fever, noted that high temperature of climate in India was not attended by the same prevalence of diarrhœa as in London, where this disease appears as soon as the temperature of water reaches 60° Fahr., and he suggested that the vegetation growing in India might prevent the water from becoming offensive. He commented also on the fact that in districts where water had from 80° to 90° of hardness, calculus was not prevalent. With reference to filters, it was noticeable that spongy iron had not been referred to.

Mr. Scriven, who had had much experience of India, condemned the three-chatty filter. He had frequently found it impossible to trace enteric fever to drinking water as its source, but he freely accepted the English experience that this disease was usually introduced by the mouth. He had always inquired into the condition of water in all houses where enteric fever occurred, and nearly always found the three-chatty filter used. The collection of sand for its supply was generally left to the native servant who on one occasion, to his knowledge, got it from the river, which was no better than an open sewer. The boiling of water was very important. He had insisted upon it while in charge of an asylum, and also in his house, and had even during epidemics never had a case in his own compound. He differed from Surgeon-General Gordon as to the existence of enteric fever in India, and he had been the first to recognise this disease in India in the person of a young officer dying at Meerut. He believed most of the continued fevers, lasting fourteen days, were of this character.

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Referring to cholera, he gave an interesting instance of the way in which this disease is communicated. In 1872 the child of a European servant had cholera, and the neighbours were called in to rub the child. On visiting the sufferer he urged upon the attendants the necessity for care in avoiding any chance of getting into the mouth of any discharge from the child. While he was speaking he noticed that one of the attendants, a woman, was rubbing her mouth with a dirty handkerchief, which had been used for wiping the child's face, while the father insisted upon kissing the patient. Three days afterwards the man was attacked with cholera and died, and the same evening the woman was attacked with the same disease and recovered.

Dr. C. E. Saunders thought a useful caution had been given against the use of filters. He also was very much at variance with the views expressed by Dr. Gordon.

After a brief reply from Dr. Nicholson, the Society adjourned.

At the meeting of the society, held at 1 Adam Street, Adelphi, on Dec. 21, 1883, the President, Dr. T. O. Dudfield in the chair, the Council brought up a report recommending the adoption of regulations for bakehouses which they had prepared. On the motion of Mr. Wynter Blyth, it was resolved that the regulations be adopted, and that two copies be sent to each country member, for himself and for his sanitary authority, that a copy be sent to each metropolitan member, and to each metropolitan sanitary authority.

The following extra metropolitan members were elected: Dr. B. Anningson, Medical Officer of Health of Cambridge Urban and the Chesterton and Royston Rural Sanitary Districts; Mr. C. E. Paget, Medical Officer of Health of the county of Westmoreland and the Jedbury Union.

Dr. Tripe read a paper on the Artisans' and Labourers' Dwellings Acts, with suggestions for their improvement, published at page 333, which was followed by a paper by Mr. Wynter Blyth on the work done by the vestry of St. Marylebone under the Artisans' and Labourers' Dwellings Act 1879 and 1882, which will be found on page 340.

Dr. Dudfield, in opening the discussion, commented on the warm interest which the public had recently manifested in the condition of the dwellings of the poor. Referring to Torrens' Act, he argued that, owing to the expense and delay incurred in enforcing its provisions, it was almost useless as a means of keeping in proper repair tenemented houses. One of the chief difficulties to be met is that poor property pays the best; as evidence that the poor had to pay for any improvement effected in the condition of their dwellings, he instanced six cottages in Kensington, which were repaired at a total cost of 30*l.*, with the result that the landlord raised the rents 30*l.* per annum. Local authorities should have the power to purchase house property at a value which was not based upon the rent which was being received, but which had regard to its insanitary condition. He was of opinion that if regulations were made under the 35th section of the Sanitary Act, and carefully enforced, they would do almost all that Dr. Tripe suggested was required. But he thought that it would be far better for the local authority to undertake the work itself instead of compelling the owner to remedy defects in a house. Finally he could not free his mind from the belief that before this question was solved there would have to be fixity of fair rent.

Dr. James Edmunds feared that harm would result if poor property were too freely demolished, as it would tend to drive people into other parts and thus cause overcrowding. He also had observed that every attempt to improve the habitations of the poor led to an increase of their expenses. He then referred at some length to the buildings for artisans which had been erected at Noel Park and at Hornsey.

Dr. Dixon argued that neither the local authorities nor the Metropolitan Board of Works could clear areas or rebuild without loss, and it was unfair for them to persevere with a course which necessitated the spending of large sums of money of other people in the provision of habitations for one class. He gave an interesting account of the delayed action of the Metropolitan Board of Works, stating that from the time he had made a representation until a decision was come to, five years had elapsed, and during that interval a Board School had been built, and in fact the condition of the area had altogether changed. The Sanitary Acts should be more penal; at the present time the magistrates too frequently adjourn cases and inflict inadequate fines; the minimum penalty should be fixed and should be made to fall upon agents as well as owners who themselves derive considerable profit from such houses. The landlords should not be permitted to receive any increase of rent for twelve months after any improvement had been carried out on the requirement of the sanitary authority, and no house should be allowed to be occupied after an order were made and pending the hearing of an appeal. He also commented on the insufficiency of Torrens' Act, especially when the owner opposed.

Mr. Greenwell was of opinion that if there were an improvement in the machinery, the Acts would be found to be thoroughly useful, and that the vestries who knew all the local conditions could better carry them out than a central authority, and he referred as evidence to Dr. Dixon's history of the delay in the Metropolitan Board's proceedings.

Mr. Jones pointed out that he had received much assistance at the hands of magistrates, who had frequently made orders for closing houses. The Nuisance Removal Acts were sufficient for the improvement of property, but the difficulty was with the destructive habits of the people dwelling in tenemented houses. He felt very strongly that Cross's Act would never suffice to provide houses for the very poor.

Dr. C. E. Saunders called attention to the Labouring Classes Lodging Houses Acts, giving power to build artisans' dwellings, and asked if they had ever been adopted by any local authority.

Dr. Bate, in commenting on the absence of penalty under the Nuisance Removal Act until the magistrate's order had been disobeyed, observed that the magistrate in his district always grants costs to the vestry. With reference to the air-space which sanitary authorities deem necessary, this should be 350 cubic feet for adults, and certainly not less for children.

Mr. Wallace gave a brief history of the operation of the Acts in St. Giles. From 1875 to 1879, 200 separate properties had been dealt with; the people who came to occupy a site which had been previously cleared are altogether of a different class from those who formerly lived there. The 1879 Act had made that of 1868 unworkable; he thought too much responsibility was thrown on the surveyor. With reference to compensation, this must be based on the rent received.

Dr. Tripe and Mr. Wynter Blyth briefly replied, and the meeting adjourned.

BIRMINGHAM AND MIDLAND ASSOCIATION OF MEDICAL OFFICERS OF HEALTH.

THE ninth annual meeting of the Birmingham and Midland Association of Medical Officers of Health was held on Jan 3; the President (Dr. W. Strange, of Worcester) in the chair. There were also present:—Drs. H. Page (Redditch), A. Bostock Hill (Birmingham), Alfred Hill (Birmingham), D. Bond (Gloucester), and Messrs. Blackwood (Cannock), C. Perks (Burton-on-Trent), and H. May (Aston Manor). At the business meeting Dr. Strange was re-elected president, Dr. Page and Mr. Perks vice-presidents, Mr. May hon. secretary, and Dr. A. Bostock Hill hon. treasurer.

Zymotic Diseases.

The newly-elected president delivered the annual address. He said the subject of his remarks would be that of zymotic diseases, and to that subject he might apply the

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word 'perplexity.' He had no solution to offer of those difficulties which gave rise to the perplexity which existed as to the origin and course of propagation which existed with regard to these diseases. His aim was to excite the minds of medical men and others to fresh efforts to unravel the mysteries which underlaid the workings of nature in regard to certain diseased processes. Their perplexities were increased rather than diminished by facts and theories brought forward by many observers, and it was 'the old, old story—orthodoxy is my doxy, heterodoxy is every other man's doxy.' The recognised zymotic diseases might be divided into two classes as regarded their causes and origin. Each of the more specific of the diseases, such as small-pox, scarlet fever, measles, owe its origin to the operation of one distinct or specific *materies morbi*. Theorists on sanitary science had contested that, but it was universally admitted. The constitution of the antecedent germs was hidden as by a veil. What could be more perplexing than the germ of scarlet fever; its persistent activity yet often lying dormant in clothing and furniture for months. But while there existed perplexities with regard to the specific diseases, still more so did they exist with the second division of zymotic diseases, including diphtheria, enteric fever, and so forth. After speaking of the prolific causes of diphtheria as being filthy surroundings, foul drains, fæcal matter, &c., the writer said that many thousands of cases of typhoid fever could not be traced to any such causes, and therefore how were these cases to be made to fit in with the specific germ theory? Another cause of perplexity was that, although the surroundings of certain localities might have been in the most unsanitary condition for years, no typhoid case had arisen until the germs of the disease had been introduced by some affected person going into such a district. It appears that they had two groups of the so-called zymotic diseases—those in which the germs or *materies morbi* were recognised by them all, and a second group in which these germs did not exist. So far as their senses would enable them to discriminate, the same morbific matter would give rise to diphtheria in one instance, to enteric fever in another. Here, as they perceived, was a distinct line of separation. In conclusion, the President expressed the wish that, with regard to the association, the members would attend the meetings in larger numbers.

A vote of thanks was passed to the President for his address, and Dr. Herbert Page then read a paper entitled, 'How can the Present Insanitary Housing of the Poor be Remedied?' which will be published in the Sanitary Record of Feb. 15.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

On the 5th inst. a numerously attended meeting of this Association was held at 1 Adam Street, Adelphi; Mr. Geo. B. Jerram, A.M.Inst.C.E., in the chair.

The minutes were read and confirmed, after which the following members were proposed by the Hon. Secretary (Mr. S. C. Legg):—Mr. Wm. Rapley, Dorking Rural; Mr. R. Collins, Southgate L.B.; Mr. W. Burrows, Bethnal Green; Mr. Williams, Pentyrch (Wales); making sixty-six members.

The next business was the resumption of the discussion on papers read at the two previous meetings on 'The Position of the Sanitary Inspector,' by Mr. Skipworth, of Caistor Union; and 'Tenure of Office,' by Mr. May, of Ramsgate (see Sanitary Record for Dec. 15).

The Chairman opened the proceedings by setting forth the all-important point that the hands of the inspector must be strengthened, and that they laboured under many disadvantages, such as the constitution of the boards from which they received their appointments being constantly changed, also that inspectors in all parts of the country had evinced a great desire to get an alteration made in the law concerning their appointments so that they might perform their duty in an efficient and untrammelled manner.

Mr. Sherborne (Chelsea) moved the first resolution—'That the position of the metropolitan, urban, and rural inspectors be assimilated;' and, in doing so, gave it as his opinion that, inasmuch as a 'nuisance' was such in one place as another, it would be most desirable that all inspectors should work under the same rules, and be subject to and receive their appointments from a central authority.

Mr. Poulson (Tottenham) seconded, and also dilated on the advantages likely to accrue to the sanitary inspectors if they were assimilated, and rendered free of local influence.

Mr. Rees (Guildford Rural) vouched for the fact that many inspectors were afraid to move in the direction of improvement because of the uncertainty of their tenure of office, and he hoped that some day it should be by law compulsory for every inspector to report and be responsible to a central authority.

Mr. Rumble (East Rumble) moved an amendment that the consideration of the resolutions be deferred for twelve months, it being, in his opinion, premature.

Mr. Rains (St. George's-in-the-East), although in favour of the resolutions, yet seconded the amendment, so that a full discussion might take place.

The discussion was continued by Mr. Middleweek (Kensington), Mr. Boulter (Bexley), and the Chairman, after which Mr. Sherborne replied; and, the amedment being withdrawn, the resolution was carried, with but one dissentient.

Mr. Boulter then moved the second resolution—'That, in order that the position of the sanitary inspectors may be strengthened, it is expedient that the appointment of all officers should be approved of by the Government Sanitary Authority, and no officer dismissed by any local authority without final appeal to, and approval of, the said Government Sanitary Authority.'

Mr. Rees seconded, and said that in the metropolis (where private interests had not so much weight as in rural districts) inspectors were more permanent in their appointments, but in the country it was very different.

It was supported by Messrs. Fisher (Camberwell), Middleweek, Chamberlain (Fulham), and Stace (Limehouse), after which Mr. Boulter replied, and the resolution was carried unanimously.

It was announced that the Hon. Secretary would send a circular to every inspector in England and Wales, asking his assent to the resolutions, with a view to a memorial being presented to the Local Government Board at an early date.

A paper was then read on 'Sanitary Inspection of the Dwellings of the Poor,' by Mr. T. Buckworth, Sanitary Inspector of St. Saviour's, Southwark, the discussion of which was adjourned until Saturday, Feb. 2.

The thanks of the meeting was accorded to Mr. Buckworth for his paper, and the Chairman for presiding, and the proceedings terminated.

INTERNATIONAL HEALTH EXHIBITION, LONDON, 1884.

The following memoranda, drawn by the several sub-committees referred to, indicate the scope of illustration of the departments referred to, and are particularly deserving of the notice of our readers:—

Memorandum from 'The Workshop' Sub-Committee.

It is desired to illustrate, in as practical a manner as possible, the relation of industrial conditions and processes to health, and to the sub-committee charged with advising on this department of the Exhibition the name of 'The Workshop Sub-Committee' has been given. The plan of production of all articles used by man is for the present purpose spoken of as 'The Workshop.' In this department the following classes of the Exhibition are comprised:—Class 41. Designs and models for improvements in the arrangements and construction of workshops, especially those in which dangerous or unwholesome processes

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are conducted. Class 42. Apparatus and fittings for preventing or minimising the danger to health or life from carrying on certain trades. Guards, screens, fans, air-jets, preservative solutions, washes, &c. Class 43. Objects for personal use. Mouth-pieces, spectacles, dresses, hoods, &c., for use in certain unhealthy and poisonous trades. Class 44. Illustrations of diseases and deformities caused by unwholesome trades and professions. Methods of combating these diseases. Preservative measures, &c. Class 45. Sanitary construction and inspection of workshops, factories, and mines. (*a*) New inventions or improvements for ameliorating the condition of life of those engaged in unhealthy occupations. (*b*, Means of economising human labour in various industrial operations. Class 46. Literature, statistics, diagrams, &c., relating to Group 5.

The following heads show the principal subjects which the sub-committee are anxious should be illustrated in the several classes of this department, the illustrations being expected to include alike the conditions of injury to health and the means proposed for improvement. Besides apparatus used, or proposed for use, with a view to minimise danger to life and health, the exhibits may comprise models, drawings, specimens both of harmful products and improved products, &c., and the committee will be specially glad to receive collections of specimens, models, diagrams, photographs, &c., showing existing evils or noxious conditions which have been modified by recent improvements.

(*a*) Ventilation of the Workshop: By simple discharge of internal air; by destroying offensive or injurious quality of discharged air. (*b*) Effluvium Nuisances: By condensing and utilising vapours; by consuming vapours; by other means, as in gas works. (*c*) Dust Nuisances: *e.g.*—In needle-grinding, mother-o'-pearl working, in weaving sheds. (*d*) Danger from Mineral Poisons: *e.g.*—In arsenic works, white-lead works, playing-card making, card-bronzing; phosphorus and match manufacture. (*e*) Danger from Animal Poisons: *e.g.*—In wool-sorting, rag-picking. (*f*) Prevention of Accidents in the Workshop: *e.g.*—Protection against heat, injury to eyes; against explosions in the mine and elsewhere.

Communications relating to the above to be addressed to 'The Secretary, International Health Exhibition, South Kensington, London;' and marked on the envelope for 'Workshops' Sub-Committee.

Memorandum from the Sub-Committee on School and Education.—Groups 4 and 6.

The following is the classification of these two groups:—*Group* 4.—*The School.*—Class 34. Designs and models of improved buildings for elementary schools, infant schools, and crèches. Class 35. Apparatus and fittings for warming, ventilating, and lighting schools. School latrines, closets, &c. Class 36. Special school fittings for storing and drying clothing. Class 37. School kitchens and arrangements for school canteens. Methods of warming children's meals, &c Class 38. Precaution in schools for preventing the spread of infectious diseases, school sanitoria, infirmaries, &c. Class 39. Special apparatus for physical training in schools, gymnasia, apparatus for exercise, drill, &c. Class 40. Literature, statistics, diagrams, &c., relating to group 4.

Group 6.—*Educational Works and Appliances.*—Class 47. Crèches and Infant Schools—(*a*) Apparatus and fittings for crèches and infant schools; (*b*) Games, toys, and Kindergarten amusements; (*c*) Models and appliances for teaching; (*d*) Examples of school work. Class 48. Primary Schools—(*a*) Apparatus and fittings; (*b*) Models and appliances for teaching, text-books, diagrams, and examples; (*c*) Specimens of work done in elementary schools. Class 49. Domestic economy in schools for girls—(*a*) Models and apparatus for the teaching of cookery, housework, washing and ironing, needlework and embroidery, dressmaking, artificial flower-making, painting on silk, pottery, &c.; (*b*) Specimens of school work. Class 50. Handicraft Teaching in Schools for Boys—(*a*) Apparatus and fittings for elementary trade teaching in schools; (*b*) Specimens of school work. Class 51. Science teaching—(*a*) Apparatus and models for elementary science instruction in schools, apparatus for chemistry, physics, mechanics, &c.; (*b*) Diagrams, copies, text-books, &c.; (*c*) Specimens of the school work in these subjects. Class 52. Art Teaching—(*a*) apparatus, models, and fittings for elementary art instruction in schools; (*b*) diagrams, copies, text-books, &c.; (*c*) Specimens of art work, modelling, &c., in schools. Class 53. Technical and Apprenticeship Schools—(*a*) Apparatus and examples used in primary and secondary schools for teaching handicrafts; (*b*) Models, plans, and designs for the fitting up of workshop and industrial schools; (*c*) Results of industrial work done in such schools. Class 54. Schools for the blind and for the deaf and dumb.—(*a*) Apparatus and examples for teaching; (*b*) Specimens of school work. Class 55. Literature, statistics, and diagrams relating to Group 6 and to the effects of 'cramming' and overwork on the young, &c. Class 56. Collective displays of school work and appliances. It will be seen that in Group 4 are comprised all the exhibits relating to school construction, to the improvement of the sanitary condition of school buildings, and to means for promoting the health of the scholars by physical exercises and otherwise. The classification sufficiently shows the character of the exhibits the Committee would wish to see provided. They would, however, lay special stress on those included in Class 39, and relating to physical education. They would be glad to see included as many models as may be convenient of typical elementary schools, and they would appeal for this purpose to school authorities and managers in this and other countries, and to architects who have given special attention to school construction, for the loan of such models, as well as of plans and diagrams. The admission of the latter, however, must be to a certain extent limited by considerations of space. As regards Class 40 of this group—and the same remark will apply to class 55 in Group 6—the Committee are anxious that this class should be limited, with a view to preventing the Exhibition being overburdened with literature. Books stowed away in glazed cases, the backs only being visible, as is the usual custom in exhibitions, are of little practical value or interest; and if available for examination a constant watch is necessary. Group 6, which forms the second division of the Exhibition within the province of this Committee, relates entirely to educational works and appliances, these being restricted to such, in the first instance, as attach to primary schools, and secondly, to scientific, artistic, and technical education in secondary and higher grade schools, it being understood that Class 49 comprises what may be considered as technical education for women. Regarding this group it will be noted that in every class where they can come in examples or specimens of school work are included. In the case of primary and infant schools the Committee would be glad to see this part of the Exhibition strictly limited to what is important or characteristic, and the same remark to a great extent applies to Class 49.

The committee would wish to arrange for as large a display of maps and diagrams as the wall space available will permit. Of the specimens of work of a handicraft or technical character the committee would be glad to see as full a collection as possible, especially of the higher class of work done in certain foreign schools. The committee do not consider it at all necessary that extensive collections of apparatus and fittings for infant and elementary schools in use in this country should be shown, especially when it is remembered that the educational collection of the South Kensington Museum is in the close neighbourhood of the Exhibition. Among other points, on the importance of which the committee would lay stress, may be mentioned the artistic decoration of schoolrooms, the exhibition of works of art suitable for use in

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schools, and the exhibition of objects suitable for school museums, or possibly of a typical school museum. As regards the instruction of the blind and of the deaf and dumb—as in all other departments—the committee would like the various systems to be fully represented, and it should be understood that no preference would be given to one system above another on account of any individual views which members of the committee might entertain. It will be noticed that in Class 55 are included the effects of cramming and overwork on the young. The committee understand that this subject is mentioned in the classification merely in order that it might be included amongst the subjects for conferences, and they do not understand that any exhibits intended to illustrate it will be sought for. As regards collective displays (Class 56) the committee will endeavour to organise displays of this character, which are likely to have a higher educational value than the exhibition of separate articles.

Memorandum from the Sub-Committee on Heating, Lighting, Ventilating, and Smoke Abatement.

The portion of Group 3, the dwelling, with which this committee proposes to deal is that comprised within Classes 24, 25, and 26, the following being the official classification:—Class 24. Grates, stoves, kitcheners, ranges, boilers, &c., for domestic use. Apparatus for heating and warming, smoke abatement, &c. Class 25. Ventilators, air-inlets and outlets, cubic space of rooms, cowls, air straining and cleansing. Class 26. Lighting apparatus; (*a*) Electrical apparatus for illumination and domestic use, secondary batteries, electroliers, accumulators, &c.; (*b*) Apparatus for lighting by gas, gas producers, gas meters, gas fittings, chandeliers, &c.; (*c*) Oil and other lamps, and stoves; mineral oil, wax and other candles, vegetable, and aanimal oils. In Class 24 will be included methods of warming;—(1) by open and closed grates and stoves; (2) by water, air, steam, and gas apparatus, designed to *heat only*; (3) by similar appliances, but combining provision for ventilation and the heating of more than one apartment; (4) by similar appliances for domestic use specially designed for the economical consumption of fuel and intended to minimise the production of smoke or other noxious products of combustion.

Domestic kitcheners will be included in this class, but appliances for cookery on a large scale will more properly be arranged under Class 6 (cookery, &c.). Furnaces and steam boilers for manufacturing operations are not considered to be within the scope of the present Exhibition. In Class 25 will be included special appliances for ventilation, other than those which may be considered more suitable for Class 24. These will include means for cooling the air supplied to rooms; means for improving the condition of the air in rooms; methods for testing air the results of experimental researches into the state of air vitiated by combustion or by respiration; results of experiments on ventilation, and any other means of effecting improvement in matters relating to this class or of diffusing knowledge about them. The official classification sufficiently indicates the class of exhibits which are desired for Class 26. It may be added that electric lighting is to be limited to illustrations of its application to domestic lighting. Its use on a large scale will be practically illustrated by the arrangements made for lighting the Exhibition itself. In the same way, the commercial manufacture of gas is not included, though its production on a small scale for private use is. Exhibits showing the progress of domestic lighting, and affording means of comparison between old and new systems are specially desired. Photometric and other tests for illuminating materials may be added to the list contained in the classification, and it is desirable that methods of gas lighting should be shown, which either assist, or do not interfere with the ventilation.

THE DISPOSAL OF REFUSE IN NOTTINGHAM.

We learn, from a graphic article in the *Nottingham Journal* that the contents of dry ashpits and pans, refuse from middens, vegetable market refuse, and indescribable rubbish brought in by private persons from fishmongers, greengrocers, and others, amounting to 260 tons weekly, which were formerly deposited in the East Croft, Nottingham, are now all dealt with in one or other way by the 'Destructor,' or by the machine which may be described as a mortar mill.

The dry refuse is lifted by an elevator to a riddle which separates the fine ashes from the coarser rubbish; the fine ashes are mixed with the market refuse, such as cabbage leaves, rhubarb leaves, clippings and cuttings off greens, fish offal, shells and the like, and, ground together in the mortar mill, form a manure which sells at a shilling per ton more than the ordinary price of the other manure which is collected here. The rougher rubbish, relics of old barrels, rotten straw, bits of crockery, fragments of glass, old shoes, and masses and messes of unutterable dankness and dirt, all go into the 'Destructor,' which consists of mighty furnaces through which a roaring draft of air is continually rushing, and at last all that remains of this constantly accumulating rubbish is a hard slag or cinder, which is very good as a material for road making. But there is a selection made even from this dirty rubbish before the 'Destructor' does its work. All old rags are picked out, and they, amounting to a ton per month, are sold. Scrap iron, to the extent of half a ton per week, is laid aside and sold, as are also bones. There is in the yard a mighty heap of tin pans, preserved meat tins, sardine boxes, &c., only a fortnight's accumulation, and for these there is a constant demand for certain chemical manufacturing purposes. Old earthenware puncheons, jugs, mugs, pitchers, pipkins, plates and dishes, which have not gone through the 'Destructor,' all go towards the formation of concrete for street making; indeed nothing is lost. It should be noted that little or no coal is used in the 'Destructor.' The varied matters contained in the refuse thrown into it furnish sufficient fuel, and the mighty current of air through it keeps the whole at a fierce heat. This heat is sufficient to fully supply steam, for the steam engine of 16 horse-power, nominal, which amongst other duties has to keep the steam pump going which raises 9,000 gallons of water per hour from the earth into a lofty cistern, from which it is supplied at a high pressure for cleansing purposes all over the premises. In addition to this, the same engine gives motion to the dynamic electrical machine, by which the electric light is kept steadily burning in the various sheds, yards, &c., when required. The chimney of the 'Destructor' is the highest in this district; its foundation alone cost £500, and consequently any gases which may escape from it are diluted and dissipated far away, so as to be rendered quite innoxious. Of the necessity of a constant and large supply of water there is ample evidence, as every night 4,000 closet pails are here thoroughly washed out by water at high pressure. Of these closet pails there are vast numbers here, some in store, some being repaired, and others being coated with tar or pitch; 26,200 of these pails are now in use in the borough. Then the carts, of which there are 43, have all to be washed clean every day and stand in rows ready for their next night's needful work. To facilitate the removal of all the manure which the Health Committee have to dispose of, a branch from the canal and sidings from the railway come into the premises, an trucks, and boats are constantly being loaded with this requisite for the fertilisation of the land, which is freely bought by all the agriculturists whose farms lie near canal or railway. A few words as to the arrangements made for the convenience of the numerous workmen employed by the Health Committee may be interesting. There is what may be called a dressing-room; here the men change their clothes, taking off the very dingy, dusty, and somewhat odoriferous garments which they wear when engaged in their

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far from pleasant labour, and putting on their decent suits when their work ceases. There is a rough but convenient lavatory, plentifully supplied with soft water condensed from the steam engine, with soap and towels almost *ad libitum*, where they can have a 'thorough good wash,' and after this they can refresh themselves at the 'Sanitary Workman's Café.' The building for this purpose is supplied by the Corporation, and it is quite self-supporting so far as its current expenses are concerned. Tea and coffee are supplied at one halfpenny per cup, soup at one penny per pint (and very good soup it is), cooked potatoes at one penny per pound. The café is open from 1 to 2 A.M., from 8 to 8.30 A.M., and from 12 to 1 at noon. There are conveniences for cooking or heating any meat that the workmen may bring, and as they leave off work at 5.30 they can all go 'home to their tea' in the evening. Recently a very necessary, but melancholy addition has been made to this cluster of buildings. Behind a pair of heavy gates in an enclosed yard stands the mortuary; on entering this place we first are in a lofty, well-lighted apartment, fitted up with the necessary arrangements for the carrying on of post-mortem examinations; adjoining to this are two smaller rooms for the reception of the bodies who have been found dead, or which, dying perhaps in some closely packed miserable lodging, have been removed here, both for the sake of the health of the living, and for a regard to decency and respect for the dead. All here is quiet, decent, orderly, and clean. The extensive and complete sanitary works in Nottingham owe much of their excellence in their details to the Chief Inspector of Nuisances, Mr. W. Richards, under the scientific superintendence of the Officer of Health, Dr. Seaton; whilst the whole organisation is watched over and kept well up to the mark by the indefatigable chairman of the Health Committee, Mr. Alderman Ford. The powerful Destructors, which do so much needful work in the clearing away all that is objectionable, and the machinery have been erected by Messrs. Manlove, Alliott, & Fryer, and the whole of the works have been carried out under the able superintendence of Mr. Arthur Brown, borough engineer.

THE HABITS OF THE LANDLORD.

AT the second annual soirée and concert of the employés of the Glasgow Sanitary Department, in the absence of Mr. Kenneth M'Leod, Dr. J. B. Russell, medical officer of health, occupied the chair.

The Chairman, in the course of an interesting address said, the sanitary inspector is the most important public official of the day. I look for the solution of these social questions which are agitating the political and philanthropic world rather to the patient, plodding, continuous dealing with detail from day to day, of which the work of the sanitary inspector is the type, than to heroic legislation on new lines. The outcast poor will not be restored to the houses of comfort and respectability by any volcanic elevating force, but only by the quiet systematic 'pegging away' of the sanitary inspector, the School Board officer, the city missionary, the district visitor, and the like humble representatives of benevolent laws and spontaneous philanthropy. I maintain that the outcast poor even of London will be elevated only by the continuous 'pegging away' of the same band of agencies. I know that Mr. M'Leod put into the hand of his district inspectors copies of that valuable pamphlet 'The Bitter Cry of Outcast London,' and that you have read it carefully, as I have myself. I know that you who are familiar with the daily work of the sanitary districts of Glasgow agree with me in thinking that if by some organisations of the sanitary executive of London the same steady improvement of existing laws could be systematically carried out over the whole area of London the worst details of that pamphlet would gradually disappear. Speaking directly to the department, Dr. Russell said: You have detected and removed 16,800 several 'nuisances,' of the varied nature of which I shall have something to say subsequently; you have forwarded to other municipal departments some hundreds of reports regarding conditions to which they have attended; you have measured and regulated the number of inmates in, and inspected from time to time, houses let in lodgings, formerly registered, numbering about 1,900 houses of various sizes, but chiefly of one to three apartments; you have made 3,300 periodical inspections of common lodging-houses, enforcing their special regulations, and prosecuting where necessary; you have made 39,600 night inspections of small ticketed houses, and brought 1,900 householders of that class before the magistrates for overcrowding; you have made 300 700 house-to-house visitations by day in your search for cases of infectious disease and for ordinary nuisances, and in the course of those visitations have discovered 4,600 cases; you have received information from other sources of 5,000 additional cases, making 9,600 in all to which you have applied various preventive measures, such as the removal to hospital of 1,850 cases, and to quarantine in the eruption direct of 330 persons from infectious houses, and the fumigation of 6,800 apartments, the lime-washing of 5,000 wholly and of 1,000 partially, the washing of 370,000 articles of clothing, the beating of 1,700 carpets, the burning and replacing of 3,400 beds; you have inspected 70 bakehouses; you have submitted to the city analyst sixty samples of adulterated food, and instituted nineteen prosecutions—the most unsatisfactory part of your work, owing to the loopholes which exist in the meshes of the Adulteration Act; you have made 3,000 inspections of food, resulting in the destruction of 16,600 lbs. of fish, 3,300 lbs. of pork, 600 lbs. of beef, and other large quantities of unwholesome articles of food; you have enforced the provisions of the dairies, cowsheds, and milk shops order, the number of premises registered at the end of the year, after sifting the applications, being 1,160; you have interred 520 bodies in accordance with the requirements of the Public Health Act; you have vaccinated 1,500 children, and re-vaccinated fifty adults; and, finally, you have applied the smoke test to the drains of 236 tenements, in only seven of which were they found to be in good order. Such has been the work done by the department in one year, and such is the work which has been done from year to year with, I trust, increasing intelligence and efficiency. We do not say that our work is perfect; we do not say that Glasgow is by any means, in a sanitary aspect, a perfect city. Far from it. The most partial critic could point out much that is not creditable to us—it may be, even cases where we have fallen short of our duty. We sanitary officials are accustomed to hear most of the habits of the people from landlords and their representatives. They argue that the houses are as good as the people deserve, that if you installed them in rooms in the West End they would soon make them as bad as their dens in the Salt Market. I am going to use some plain language about landlords (including house-factors and all their doings, for which landlords are clearly responsible), and before doing so I wish to say that while I must use the collective term 'landlords,' I do not mean that all are alike. This proviso is not logically necessary, but still to avert any virtuous indignation I make it. You have only to turn to the books of the Sanitary Department to find that there are sins on both sides; and with which side ought we have most sympathy—with the educated, astute, well-clad, well-fed, associated, demonstrating, many-voiced landlord, or the ignorant, ill-fed, isolated, abject tenant, afraid to speak, lest with his poverty and his habits he should be turned wholly adrift? But I leave this question of sympathy aside. We have to do with the question of fact. What are the habits of the landlords, the habits of whose tenants are so carefully made patent? What are nuisances? Of those 16,800 which you have removed, fully 12,000 come under the definition of the Public Health Act:—'Any insufficiency of size, neglect of structure,

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defect of ventilation, want of repair or proper drainage, or suitable water-closet or privy accommodation or cesspool, and any other matter or circumstance, rendering any inhabited house, building, premises, or part thereof, injurious to the health of the inmates, is unfit for human habitation or use.' Now, you will observe that there is nothing within the scope of this definition for which the landlord is not responsible; and I say that there is nothing which can be enforced under this definition upon the landlord which, as a matter of duty between man and man, as a matter of moral obligation alone, he is not bound to do. I hold landlords responsible for all the doings of their factors. He rarely, if ever, makes an inspection of the material condition of his tenement; hardly ever has a tradesman to observe and at once repair these derangements of drains, shores, pipes, and working apparatus of a house which are sooner or later to occur. Nay, more; every post brings to Mr. M'Leod letters and post-cards, mostly anonymous, telling him of the most serious nuisances which have been repeatedly complained of to the landlord, and 'he has done nothing,' and every day similar complaints are made at the Sanitary Office. In short, where the 'habits of the people' are most heard of the habits of the landlord are these—to ignore entirely his moral responsibility, and to regard his legal responsibility as created only by the official notice of the sanitary inspector. He looks for no nuisance; he does not see it as a landlord even where it is before his bodily eyes when he is collecting his rents; he does not acknowledge it when his tenants point it out to him; he waits until he is officially notified that it is there, and in many cases he parleys and fences with the sanitary inspector until he gets on the threshold of the court of law, and then at last, with the worst possible grace, he does his duty. In short, if you were shown the nuisance registers of the Sanitary Department of Glasgow, without knowing what they are, you would say that they were the well-kept books of the clerk of works of the landlords of Glasgow. You see in the one column details of the nuisance—choked drains, burst soil-pipes, water-closets with specified derangements of apparatus, roofs out of repair, so that the water drips into a bed, and so on—and in another column technical details · the work requisite to be done. All this is copied out and sent to the landlord. We even test his drains to enable him to know whether they are in order, though he frequently refuses, in the face of the strongest suspicion, lest we should push him into expense. Yet he is not thankful for this gratuitous assistance in the management of his property. I say gratuitous, because who pays for all this? In Glasgow the landlord pays sanitary assessment on houses rented at 4*l.* and under, receiving an abatement of 25 per cent. for his trouble; but above 4*l.* rental the whole assessment is paid by the tenant. The rental on a pound the landlord pays is decreasing year by year, so that it is now only half what it was twelve years ago, and you have an occupier's rental of 3,037,000*l.* paying full rates, against a landlord's rental of 28,400*l.* paying three-fourth rates. The incidence of taxation is a profound and intricate question, but it requires only a sense of justice to convince us that the landlords of Glasgow ought at least to be grateful to the sanitary department for assisting them to maintain their property, in accordance with the requirements of the law, at the expense of the tenants. I think I have succeeded in proving that the habits of the landlords are not what they ought to be, and that the law as presently administered does not tend to make them better.

LOWER THAMES VALLEY DRAINAGE.—Following the example of Mortlake and Kew, the Chiswick Local Board have decided to oppose the construction of extensive sewerage works at Mortlake, as proposed by the Lower Thames Valley Main Sewerage Board. It is understood that the Duke of Devonshire will vigorously oppose the project.

HEALTH OF IRELAND.

THE quarterly return of marriages, births, and deaths in Ireland for March 1883 shows the facts relating to marriages for the fourth quarter of 1882, and those for births and deaths for the first or winter quarter of 1883. The births and marriages were below their averages in the corresponding quarters of recent years, while the deaths showed an excess. The returns of pauperism for the quarter, as compared with those in the corresponding period of last year, show but slight variation in the number of persons in receipt of indoor relief, but an increase in the number of outdoor paupers; the numbers both of indoor and outdoor paupers considerably exceeded the average for the first quarter of the preceding ten years.

The births registered during the three months ending March 31 last were 32,065, which were equal to an annual rate of 25·4 per 1,000 of the population in the middle of this year, estimated at 5,042,572 persons: this rate was slightly below the average in the corresponding period of the five years 1878-82. In the four provinces of Ireland the birth-rates were 25·5 in Leinster, 24·7 in Munster, 24·5 in Ulster, and 24·6 in Connaught.

During the first quarter of last year the deaths registered in Ireland were 29,558, equal to an annual rate of 23·4 per 1,000 of the estimated population, which was 1·1 above the average rate in the corresponding quarter of the five years 1878–82. This excess was principally owing to the severity of the weather during the latter half of the quarter, which especially affected elderly persons; compared with the comparatively mild first quarter of 1882, the death-rate among persons aged upwards of sixty years in the first three months of this year showed an excess of no less than 36 per cent. In Leinster the general death-rate last quarter was 26·4, in Munster 20·7, in Ulster 24·2, and in Connaught 18·2.

The 29,558 deaths registered in Ireland in the quarter under notice included 615 from 'fever' (principally enteric), 501 from whooping-cough, 439 from diarrhœa, 342 from scarlet fever, 220 from measles, 69 from diphtheria, and 4 from small-pox. Thus, 2,193 deaths resulted from these principal zymotic diseases, equal to a rate of 1·7 per 1,000, against 2·0 in England and Wales from these diseases during the same period. In the aggregate the deaths from the principal zymotic diseases in Ireland last quarter were somewhat in excess of those in the preceding quarter. Whooping-cough was the only prevailing epidemic, though the mortality from fever exceeded that recorded in recent quarters. Measles and scarlet fever were prevalent in the province of Ulster, the latter in the town of Belfast.

The return contains an interesting and valuable table relating to the mortality in urban and rural sanitary districts. In the forty-eight urban sanitary districts of the country (including Dublin), comprising a population of rather more than a million persons, the death-rate from all causes during the quarter was 32·3, and the zymotic rate 3·5; in the rural sanitary districts, containing a population somewhat exceeding four millions, the death-rate did not exceed 20·5, and the zymotic rate was only 1·2. In Dublin, consisting of nine urban districts, and having a population estimated at 349,685, the death-rate from all causes was 34·2, and the zymotic rate 3·7. In London during the same period these rates were but 22·1 and 2·1 respectively, and in Edinburgh 21·1 and 2·6 per 1,000.

The number of emigrants who left Irish seaports during the first quarter of 1883 was 13,399, and was 900 less than the number in the corresponding period of 1882, but 3,408 above the average for the first quarter of the ten years 1873–82. According to the Board of Trade returns, the number of emigrants of Irish origin who left the various ports of the United Kingdom where emigration officers are stationed, which had been 7,458 and 11,159 in the first quarters of 1881 and 1882, declined again to 9,510 in the three months ending March 31 last.

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SANITARY ANTICIPATIONS AND SUGGESTIONS.

By Our Roving Commissioner.

It is generally expected that the year 1884 will not prove an uneventful one to those connected with the different branches of sanitary appliances, or those questions connected with public or domestic welfare in which the Sanitary Record interests itself.

The Dangers accruing from the Upsetting of Mineral Oil Lamps.—The raising of this important question, to which I alluded in my last, has already been productive of some good results. I have received several letters on the subject, and have had communications with many lamp manufacturers, all of whom, with one exception, have admitted the necessity pointed out. Nearly all of them, however, complain of the indifference of the public with regard to any improvement introduced for their safety if it costs a trifle more. The Silber Light Company inform me that some time since they introduced on their lowest priced lamps an attachment such as I suggested, but because the retail price of the lamps was increased a few pence it met with scarcely any demand, and they were induced to let it drop. I am, notwithstanding, hopeful that they will again turn their attention to the matter, and re-introduce something for the purpose. I have been favoured with drawings from a firm in Manchester who have recently patented a new invention of a somewhat novel but simple character, which, if it be purchased by the public, should effect the purpose; but as it is not quite ready for sale, I defer any description until it is before the public.

Accidents from Lifts.—This is another question concerning life and limb constantly at stake, and which requires attention on the part of manufacturers, and of those who use lifts. These appliances, which have become a necessity in many instances on account of the altered conditions under which warehouses are erected and business is carried on, are yearly increasing in number, and with their extension accidents become more numerous. These occur from two causes, the breakage of the chain or rope by which the lifts are raised, and from persons falling into the well or opening in which they travel. There is in existence an Act of Parliament compelling manufacturers to 'fence' machinery, but whether its provisions are clear enough to make it imperative on the users of lifts to adopt some protective appliance to prevent accidents I do not know; it is, however, a fact, that in numerous buildings let out in offices, lifts are at work all day long with unguarded openings on every floor, appearing almost to solicit accidents. This class of hoist generally consists of a series of cages, separated from each other in height about the distance between each floor; on arriving at the top floor they traverse a short plane and and then descend, their action being continuous; consequently we have two wells to guard against. The distance between these is quite sufficient, should a false step occur, to break limbs at the least; but in the case of warehouses, where only one cage is employed, and only raised or lowered at intervals, the depth from the higher floors is so great that death would in all probability ensue as the result of a fall. The last accident I read of, only a week or so since, was of this character. As regards the breaking of the raising gear, there are already inventions to secure the stoppage of the cage in such cases; one of the most to be relied on, with which I am acquainted being that of Messrs. Hodkinson & Clarke, of Birmingham, and which I see mentioned in the Sanitary Record of Dec. 15 last, in connection with an exhibition at Bristol where it was on view. What appears to me to be as much required is a protection on each floor to prevent falling into the opening. Such an arrangement should be of an automatic character to ensure its being always in its proper position as a guard. Difficult as it may at first sight appear, surely the ingenuity of inventors may be exercised with success in so humane a cause.

The International Health Exhibition.—This Exhibition is creating as much interest as the recent Fisheries Exhibition. There is reason to believe that it will be of a thoroughly representative character, and to the general public will probably prove more interesting than its predecessor, on account of the very comprehensive character of the exhibits, appealing as they will to every class of the community—as to what they eat, drink, and wear, and surround themselves with, in great detail. A considerable strain is being placed upon the executive, as the time at their disposal since the closing of the last exhibition was comparatively short for such an undertaking, but they are working with a will that should insure success.

In connection with the Exhibition my attention has been called by Messrs. C. W. Pare & Co., merchants, of 126 London Wall, and Yokohama, Japan, to a scheme set on foot for representing provincial, colonial, and foreign exhibitors. These gentlemen propose to act as agents to any firms who will entrust their representations to them. They offer to apply for space, clear and receive goods, fit up stands, arrange exhibits, and provide efficient assistants; and, in short, do everything that the exhibitor himself would be likely to consider necessary were he present himself *in propriâ personâ*. The idea is not a new one, some such systems having been carried out in previous exhibitions both at home and abroad, but they have not always proved as satisfactory to exhibitors as could have been wished. I have taken some pains to inquire into Messrs. Pare's scheme, and while being of opinion that no representative is equal to the exhibitor himself, I believe that the firm in question are fully alive to the responsibilities they offer to undertake, and that anyone who places his representation in their hands will be honourably and efficiently dealt with.

Ventilation.—This still remains a somewhat vexed question, from the fact that no authoritative verdict on the different appliances has as yet been pronounced by any public body who have taken the matter in hand. Of late years the number of makers of ventilating appliances for all purposes have very much increased, and although there is not a vast difference of arrangement in the construction of many, there is sufficient to enable the makers to claim certain advantages from their own point of view. The Sanitary Institute have taken several of these apparatus in hand, and manufacturers have waited very anxiously for their report, but, to their disapp intment, at the last meeting of the Institute at Glasgow in September and October last, Professor Corfield, in announcing the awards, intimated that they had not been able to arrive at a satisfactory conclusion as to the value of the ventilators they had had under test, owing to their not having been able to obtain instruments sufficiently to be relied on for the purpose. This seems to imply that the question must remain in abeyance *sine die*, a most unsatisfactory state of affairs to those manufacturers who have placed their inventions in the hands of the Institute as well as to the public at large, whilst it casts a slur on the makers of mathematical instruments that is not altogether deserved. Perhaps the Council of the Institute are not aware that there is one firm at least whose instruments may be relied upon with absolute certainty. I allude to those made by Messrs. John Davis & Son, of Derby and London, who are the original makers of the Biram Patent Anemometer, an instrument in use in all mines in the kingdom, and in many parts of the world besides. In a conversation I had a few days since with one of the partners of the firm, he told me that they were prepared to supply any number of anemometers that should register exactly alike, and with the most perfect accuracy. I commend this announcement of the Messrs. Davis to the notice of the Sanitary Institute. The inventor of this anemometer is also the patentee of an anemometer testing machine and standard anemometer, probably the most perfect of its kind to be met with, and every instrument made by the firm undergoes the ordeal of a severe trial by this apparatus, which is fixed in a specially arranged room at Messrs. Davis's

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works at Derby. A suggestion has been made to me by certain makers of ventilating appliances that the forthcoming Exhibition offers an excellent opportunity of settling this question, and placing each invention before the public on its merits. It is contended that the ventilation of buildings generally is now considered to be a necessity, and has become of national importance, that the highest authorities should take the matter in hand, and that the tests should be made gratuitously, the paying of fees, which to men of small means is a heavy tax, being generally objected to upon principle, and as frequently causing invidious remarks, if long delays occur in the announcement of results. My correspondents urge that the Exhibition is to remain open about six months, and, if the tests were commenced almost simultaneously with the opening, sufficient time would in all probability be available for the purpose. They point to the fact that the whole of the tests at the Smoke Abatement Exhibition were carried out gratuitously, with the utmost liberality and at great cost to the committee, who did not shrink from incurring it, as they considered the question one of absolute necessity, and they further allude to the comprehensive official report, embodying these tests, that has been published; a volume that, it was remarked, will be an authority for many years to come.

ILLUSTRATED SANITARY PATENTS.

714. (1883.) IMPROVEMENTS IN THE MEANS OF APPARATUS FOR WARMING HOUSES: S. DEARDS, HARLOW, ESSEX. [6*d*.]—This invention consists in constructing behind the grate a supplementary flue which may communicate at its upper part with the ordinary flue, and in forming at the back of the grate or fireplace a number

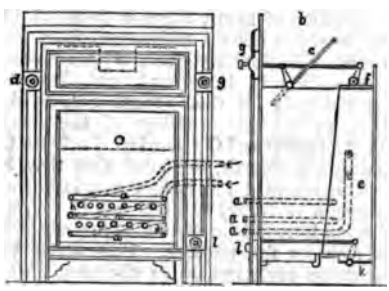
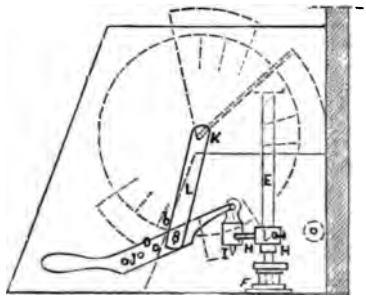


FIG. 1. FIG. 2.

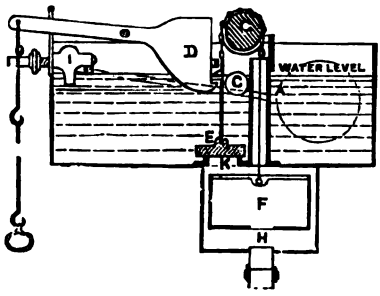
of openings leading into the supplementary flue. The coil is led into and through the supplementary flue, and this flue as well as the ordinary flue is fitted with a damper, which can be worked by a handle at the front of the grate or otherwise. Fig. 1 of the annexed drawings is a front elevation, and Fig. 2 a side elevation. *a* is the fire-grate, the bars of which are hollow and form part of a coil or system of hot water pipes for warming other parts of the house or greenhouse. *b* is the ordinary flue from the fireplace, and *c* is a damper or regulator to the same, worked by a handle *d*. Behind the grate is a supplementary flue or fire-box, *e*, which may either communicate with the flue, *b*, as shown, or with other outlet, the communication being regulated by a damper, *f*, worked by a handle, *g*. In the back, *h*, of the fire-place are a number of openings, *i*, leading into the supplementary flue, *e*. The coil of pipes, *a*, which forms the grate extends into the supplementary flue, *e*, as shown. When the damper *c* is open and the damper *f* closed, the products of combustion pass into the ordinary flue, *b*, in the usual way. When, on the other hand, the damper *c* is closed and the damper *f* opened, the draught is downwards through the fire, the products of combustion passing through the openings *i* into the supplementary flue or fire-box, *e*, and thence to the ordinary flue, *b*. There is an opening in the bottom of the flue, *e*, fitted with a valve, *k*, which is worked by a handle, *l*, so that in case the heat in the supplementary flue, *e*, becomes too great, air can be admitted directly thereto, and the draught through the fire be proportionately diminished.

775. (1883.) IMPROVEMENTS FOR CONSUMING SMOKE IN FURNACES: LA COMPAGNIE DU CHAUFFAGE INDUSTRIEL, PARIS, *per* J. H. JOHNSON, ESQ. [8*d*.]—This invention relates to means or apparatus for effecting the consumption of smoke in furnaces by avoiding the admission of an excess of air and automatically regulating the volume of air introduced underneath the bars and also in some cases by employing a smoke-consuming apparatus having a steam jet, which is automatically brought into action at certain times for a limited period, as hereinafter described.



The effect of this combination is that when the furnace door is opened the free extremities of the levers D and H will describe arcs of circles, as shown in dotted lines, thereby moving the valve spindle K by the intervention of the crank L and lever J, and thus closing the valve to an extent that can be regulated by shifting the crank pin A in the holes in the lever. The figure gives a side elevation of an arrangement of mechanism for working the valve, whereby the valve is closed when the furnace door is opened, but opens again gradually after the door has been shut so as not to return to its normal position until after a certain lapse of time.

904. (1883.) WASTE PREVENTING CISTERNS: B. C. CROSS, C.E, YORK. [6*d*.]—This invention consists in constructing a waste preventing cistern for closets, urinals, or any other purpose where a certain quantity is required to be drawn off at each discharge of the cistern. The



action is as follows. The ball valve fills the cistern and when nearly the required quantity is in the cistern the catch B is projected on to the lever D. Should the lever be then pulled it slightly raises the valve E (the lever is so fixed that it can only lift the valve a certain regulated height), the water then rushes through the valve seat K into the can F; this can has a hole in the bottom of same but smaller in diameter than the valve seat, consequently

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when the water suddenly rushes into the can it is thus weighted and becomes heavier than the valve E and causes the valve to rise higher than the lever can lift it—when immediately by reason of the float being lifted out of the water, the catch falls back to its original position—the water then continues to discharge until the cistern is nearly empty, when the can F again becomes lighter than the valve E, and immediately the valve returns to its seat, whether the lever be up or down.

984. (1883.) FACILITATING DRAUGHTS, &C. F. HAMMOND, LONDON. [6*d.*]—In both of the views the same letters indicate corresponding parts and it will be seen that the pot is formed in two parts, the lower portion *a* and the upper portion or cap *b*. The internal diameter of the upper portion b^1 of this cap *b* is of about the same dimension as the internal diameter of the main body or outlet a^1 of the pot *a*, but this cap or upper portion is enlarged progressively downwards to about the part b^2 so

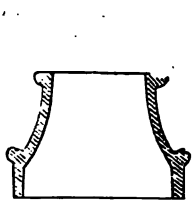


FIG 1

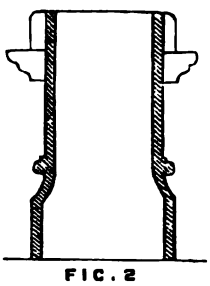
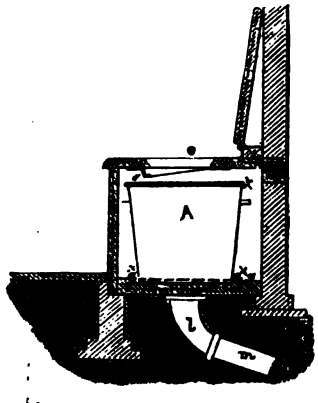


FIG. 2

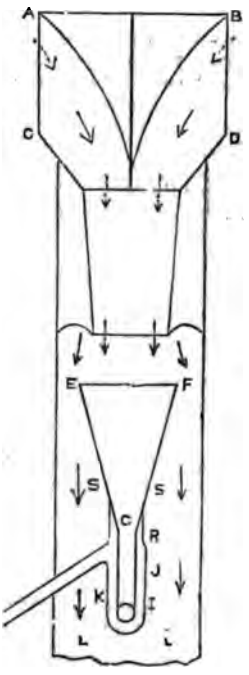
as when applied over the upper portion of the part *a* to leave space between the part b^2 and the exterior of the part a^1 for the free passage of air to act upon the smoke and products of combustion to facilitate upward draught as well as to prevent a down draught. The cap or upper portion *b* rests on projections a^2 from the part *a*, and there are ribs or suitable parts a^3 to aid in maintaining the correct relations between the upper portion of the part *a* and the lower portion of the part *b*.

1271. (1883.) SANITARY CLOSET RECEPTACLES: C. K. LAWTON, MANCHESTER, SANITARY INSPECTOR. [6*d.*]—This invention relates firstly to improvements in the construction of sanitary pails or receptacles used in conjunction with what are known as 'sanitary closets,' by which the solid organic excrement deposited therein will become separated from the urine or liquid, thereby prevent-



ing the aforesaid solid matter from becoming offensive whilst remaining in such pail or receptacle, thus requiring the said pail or receptacle to be less frequently removed for emptying and cleansing than would otherwise be the case. The figure gives a side view partly in section of so much of a closet as is requisite to illustrate this invention. At *e* is the seat of the closet, provided with a guard *f*, to direct the urine into the pail or receptacle A, which is placed beneath the seat *e*. The floor *g* of the closet is formed with a sunk portion recess or depression *h*, of suitable form for receiving the bottom of the pail or receptacle A above described. The floor *g* of the closet above named may be formed of stone, cement, plaster, earthenware, metal, or any suitable material.

1239. (1883.) FRESH AIR INJECTOR AND DOWNCAST VENTILATOR: S. L. LOW, Jun., B.A., LONDON, W.C. [6*d.*]—This new or improved injector or ventilator is especially designed for supplying a continuous stream of fresh air to ventilate any compartment of a ship, vessel, or other place without admitting any water. This im-



proved down-cast ventilator consists of the following essential parts, viz., a 'suction head' A B C D to which is fixed a shaft provided with a 'water-course' D E F G, and an 'air course' D E F S L. At the lower end of the water course is placed a 'siphon exit' for the water. This siphon exit consists of a pipe R (fitted at its lower end with a spheroidal floating valve) leading into a vessel J I K containing water. This vessel is provided with an overflow pipe O, through which any water entering the shaft of the ventilator is carried off. When not in action (*i.e.* when no water is entering the vertical pipe R from the water course D E F G) the buoyancy of the spheroidal floating valve prevents the passage of any air owing to the upward pressure exerted by the water in the vessel J I K on the spheroidal floating valve, which then presses against the lower opening of the vertical pipe R. Thus all air entering the 'suction head' A B C D is forced down the air course D E F S L.

1570. (1883). VENTILATOR EXHAUSTERS, &C. R. A. HUNTER, DUBLIN. [8*d.*]—This invention has for its object improvements in ventilators and chimney exhausters. The ventilator, which is very simple in its construction, is illustrated by fig. 1 of the annexed drawings. It consists of a pipe A and deflecting plates B and C. The pipe A projects up a short distance through the lower plate B. The wind blowing in any direction causes a current between

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the plates B and C, and this carries with it the air from the pipe A, whereby an upward draft is established. He

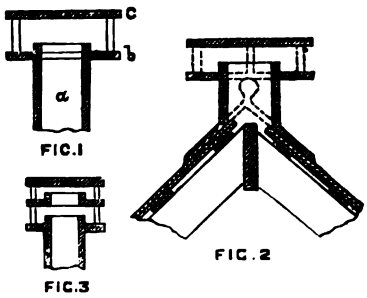


FIG.1

FIG.2

FIG.3

makes the ventilator in pottery ware to be applied as a ventilating ridge tile. Fig. 2 illustrates the method. He sometimes applies an intermediate plate or plates, as illustrated by fig. 3. By a like appliance he improves the draught in a chimney. As a chimney exhauster it may be applied to a single flue. But by preference, and especially in building new houses, he constructs a shaft large enough to take the smoke of all the fires. Immediately above the fire, instead of taking the flue up singly, he turns it into the main shaft, which is surmounted with the exhauster.

1574. (1883.) IMPROVEMENTS IN LAVATORIES, BATHS, W.C.'s, &c. A. F. MORRISON, MANCHESTER. [6*d*.]—This is a means to combine and simplify the supply and discharge fittings of lavatories, baths, sinks, closets, and other appliances. It would be impossible to give a proper idea of the various arrangements without copying the whole of the specification. But we give in our illustration an idea of the improved lavatory upon this patent.

In these views A is the basinmade in the improved shape, namely like a D with the straighter side to the front and deepest at the side nearest the waste opening

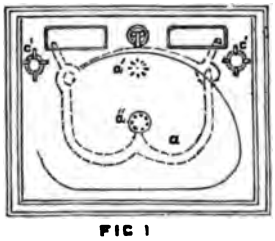


FIG 1

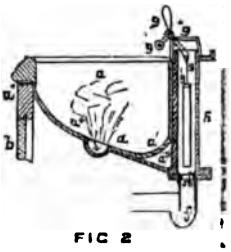


FIG 2

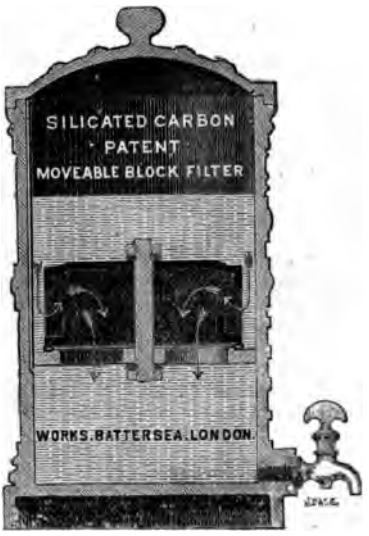
A^1, A^2 is the flange which extends round or partly round the lavatory to conceal the joint between it and the frame or stand B, C is the supply pipe made in one piece with the basin A, see fig. 3, and D is a second supply pipe, see fig. 2, connected to an opening near the middle of the basin, a rose A^4 is placed over this opening to give a vertical spray. The bodies of the supply taps C^1 are fixed beneath the top of the lavatory, and the screwed ends of the bodies are brought through the slab or top of the lavatory and the stuffing boxes and caps secured from the upper side so as to be easily accessible, E is the waste stand pipe secured to or connected with the trap F, see fig. 2, the stand pipe and basin are connected by a projecting pipe A^3 formed with the basin A.

AN examination of the gross and the rateable value of house property in London shows a difference of over six millions, 4 per cent. interest on which amounts to nearly a quarter of a million, which represents the saving to the ratepayers by the new scale of water rates.

NEW INVENTIONS.

THE SILICATED CARBON FILTER COMPANY'S NEW DOMESTIC WATER FILTER.

IT is now generally understood that a water filter, to secure the approbation of sanitary authorities, must be constructed in such a manner that it can be taken to pieces by the most inexperienced person for cleansing purposes. That its working parts should be easy of access, and that the whole of the arrangements should be of the most simple construction, are as essential as that it should perform its work effectually. The new filter recently introduced by the Silicated Carbon Filter Company, of Church Road, Battersea, appears to answer these requirements to their fullest extent. Without in any way departing from the composition of their filtering medium, the silicated carbon block which has attained so wide a popularity, the company have constructed their filter in such a manner that it can be taken out instanter, and the whole of the interior exposed to view. Illustrations are appended showing interior views with and



without the carbon block attached. By these it will be seen that the interior is simplicity itself, the removal of the

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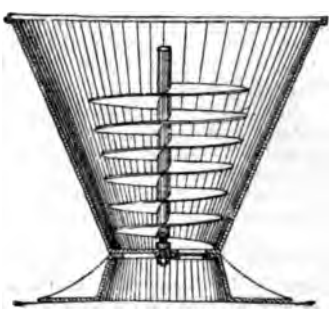
carbon block leaving a mere cylinder to be cleaned. The block rests upon a ledge formed in the cylinder and upon an India-rubber washer, a spindle of earthenware passing through it with an India-rubber washer at top and bottom, a screw nut also of earthenware securing the whole and rendering the passage of water impossible except through the carbon. The block is made non-porous on the top and edges, so that an upward direction is given to the water, which enters it at the sides and has consequently to pass through a greater thickness of the silicated carbon, ere it enters the receiver of filtered water, as shown by the arrows. Extra blocks can be supplied with the filter, which, however, except in the case of accident, will last a considerable time, and to cleanse the block, it only requires to be plunged in boiling water, and scrubbed with a hard brush. The few parts being interchangeable, new ones can be had at any time, with the certainty that they will fit into their proper place, and the company have arranged to supply any of the numerous pattern filters they make on the improved principle, without extra charge. One very commendable feature in these filters is the very moderate price at which they are supplied, a matter of no small importance in an article which should be in universal demand.

NEW MIXING AND CHOPPING MACHINE.

A COMPANY named 'The Universal Mixing and Chopping Machine Co., Limited,' whose offices are at 49 Queen Victoria Street, E.C., are about to introduce a new machine for purposes set forth in the title. An illustration of one of its forms is appended. The name



'Universal' is a comprehensive one; but it is sufficiently appropriate, for there appears to be nothing in the shape of mixing, crushing, massing, grinding, or chopping that this machine will not accomplish, from the cutting up of meat for sausages, to the breaking of such solid substances as bricks, stone, and asphalt. The distinctive name of the machine itself, 'Simplex,' is also well chosen, for a less complicated apparatus, or one with fewer working parts it would be difficult to devise. It is, however, rather unfortunate that in the name Simplex the company have selected one which has been used for some time by a firm of sausage-making machine manufacturers, and must not be confused with the universal accomplishments of the machine under notice. The only acting power in this appliance is an Archimedean screw, as shown in the illustration, and this is fixed in vessels of different shapes and sizes, either vertically or horizontally; and of a substance varying from a thin steel-knife blade to a heavy implement of chilled iron, according to the material to be operated upon. Some of the many purposes to which this apparatus is applicable are the mixing of various kinds of powders, the blending of teas, coffees, &c., and other dry substances required in various classes of manufacturing business. For mixing dry substances with liquid—such as paints, printing inks, and materials for buildings; for massing such materials as dough, putty, concrete, &c., and, on a smaller scale, of materials for pill-making; for pulping old materials—such as linen, felt, shoddy, and paper—it is equally applicable; and, turning to domestic matters; the cutting up of meats, fish, &c., for sausages, rissoles, paste and essences, finds in the Simplex the most rapid machine for effecting the operation. In building operations and preparing materials for roads, the heaviest and most solid substances are crushed and prepared by this machine as easily as the lightest processes for which it is intended are effected. For these varied purposes the mixer is made in sizes from that of a small sausage-making machine to one adapted to the crushing of stone, and worked by steam power.

AN IMPROVED TEA KETTLE.

MR. SCHOENING, of Chicago, has brought out a tea kettle embodying novel features which render it very convenient, and obviate the necessity of lifting the kettle whenever it is desired to pour water from it. The kettle has a faucet spout which is closed entirely when in a vertical position, is entirely open when in a horizontal position, and when placed in an inclined position, it is open like the spout of an ordinary tea kettle, but the elevation of the spout prevents the water from flowing out. Clips are provided for holding the spout in the vertical or inclined position. In addition to these improvements in the spout, the tea kettle has side covers at the top, each provided with a knob of non-conducting material. This arrangement of covers prevents the steam from escaping in such a way as to burn the hand when grasping the handle. The handle when in a horizontal position rests on one or the other of the cover knobs, and is thus prevented from becoming heated. The spout is provided with a knob of non-conducting material, by means of which it is raised or lowered.

REVIEWS.

Local Government. By M. D. CHALMERS. Pp. 160.
The Poor Law. By the Rev. T. W. FOWLE, M.A. Pp. 163. The 'English Citizen Series.' London: Macmillan & Co.

THE stated object of the excellent series of volumes on the Rights and Responsibilities of the English Citizen, of which these books form part, is 'to meet the demand for accessible information on the ordinary conditions and the current terms of our political life.' The affairs of business, contact with other men, the reading of newspapers, the hearing of political speeches, may give a partial acquaintance with such matters, or at least stimulate curiosity as to special points. Such partial acquaintance, however, with the most important facts of life is not satisfactory, although it is all that the majority of men find within their reach. These books are not intended to interpret disputed points in Acts of Parliament, nor to refer in detail to clauses or sections of those Acts; but to select and sum up the salient features of any branch of legislation, so as to place the ordinary citizen in possession of the main points of the law.

So far as regards the special subjects of Local Government and Poor Law, Messrs. Chalmers and Fowle have been completely successful in attaining the desired result. Of the two, Mr. Chalmers' book is the more readable, though both authors handle their subjects well. Mr. Goschen once observed that 'there is no labyrinth so intricate as the chaos of our local laws.' Mr. Chalmers does his best to furnish his reader with a thread to this labyrinth, and leads him on through the devious paths of the parish, the union, the municipal borough, the county, the sanitary district, the school district, the highway area, and the metropolis until he reaches the crowning glory of the Local Government Board. The average citizen knows little and cares less about the way he is governed. If the rates are raised he grumbles, much as he would grumble at the bad weather; but he regards both things as being

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equally unmendable by any act of his own. Mr. Chalmers' book should stir him to a sense of his personal responsibility in the matter, and to a determination to assist in getting things done better. The volume is more than readable, it is interesting; and there is a quiet play of humour in its pages which adds much to its piquancy.

Mr. Fowle's book is framed in a more solid fashion, and raises questions of great social and economic importance. State relief of the indigent is a necessary part of civilised social life, and they mistake the conditions of the problem who regard it as a temporary episode or something peculiar to ourselves. No one doubts that there is much to improve in our present poor-law administration. Whether Mr. Fowle's suggestions to this end are sufficient for the purpose or desirable in themselves is perhaps a debateable point; but there can be no question as to his mastery of the subject or as to the value of his facts.

A Treatise on the Laws relating to Municipal Corporations in England and Wales. By the late T. J. Arnold. Third Edition. By SAMUEL GEORGE JOHNSON, Town Clerk of Nottingham. London: Shaw & Sons. 1883. Pp. 629.

The Municipal Corporations Act, 1882. With Notes by HUGH OWEN. London: Knight & Co. 1883. Pp. 446.

The English Municipal Code. By J. W. HUME WILLIAMS and I. R. SOMERS VINE, F.S.S. London: Waterlow & Sons. 1883. Pp. 299.

'ARNOLD'S Municipal Corporations' has long been known as one of the best and most trustworthy text-books on the law affecting boroughs and municipalities. The passing of the consolidated Municipal Corporations Act of 1882 unfortunately rendered the last edition almost useless for purposes of reference; and Mr. Johnson has therefore rewritten the book, retaining in his introduction so much of Mr. Arnold's work as retains its importance. Mr. Owen's book is modestly dated from Pump Court, Temple, but probably most people are aware that its author is the Secretary of the Local Government Board, and is therefore entitled to rank as an authority on the subject. Messrs. Williams & Vine's compilation is a much cheaper and less important volume, but it appears to contain a variety of useful annotations. It is in the nature of things impossible to say much concerning books which are reprints of Acts of Parliament with notes and illustrations; but it may be observed shortly of the annotations of all three authors that they are good, to the point, and sufficient for the purpose. The possession of one or other of the volumes is practically indispensable to the efficient performance of the duties of all municipal officials.

Deutsches Wochenblatt für Gesundheitspflege und Rettungswesen. Herausgegeben von Dr. Paul Börner. Berlin: S. W. Kochstrasse 55.

A PERUSAL of the first four numbers has given us a very favourable impression of our young contemporary. The higher sanitary literature of Germany is unsurpassed by that of any country, but scientific and official opinion is in advance of that of the public, and the people stand in need of education in matters which, among us, with all our shortcomings, are part of our everyday life. While the existing periodicals devoted to hygiene and intended for medical, scientific, and official circles leave nothing to be desired, the few of a more popular character are either of purely local interest, or are popular in the worst sense of the word. It is the intention of the editor, who was secretary to the late Congress and Exhibition of Hygiene at Berlin, to provide the intelligent laity with information solid, though not too scientific or technical, on all matters affecting the public health or the well-being of the individual, avoiding alike abstruseness and superficiality. The well-ascertained results of scientific research, the proceedings of learned and public bodies, discoveries, inventions, and laws bearing on hygiene in every branch, will be recorded, and charlatanry of every kind exposed. Protection of life from fire and water is included in the programme, as it was in that of the Exhibition. The papers appear thus far fully to bear out the promises of the editor, and are all original, with the exception of two by Professor Humphry, reproduced from our pages, on infant feeding, and on the foot and its treatment. The editor has secured the co-operation of all the most eminent authorities in Germany, and his journal seems to well deserve the assistance he asks of medical men and others interested in the cause of hygiene, in furthering its circulation in their respective neighbourhoods.

LAW REPORTS.

FRYING FISH A NUISANCE.

Mr. David Boyton has been summoned by the Braintree Local Board of Health, at the Braintree Petty Sessions, for carrying on a noxious and offensive trade—to wit, frying fish. The information was laid under Sect. 112 of the Public Health Act of 1875, which, after specifying certain offensive trades which could not after the passing of the Act be established in an urban district without the consent in writing of the sanitary authority, adds, 'or any other noxious or offensive trade, business, or manufacture.' Mr. Holmes, on behalf of the Local Board, cited a case in which it was laid down that it was sufficient to show that a trade was substantially offensive to the senses, although it was not proved to be injurious to health. Mr. Harrison, medical officer of health to the Board, said he thought the smell was a nuisance and injurious to health. He thought frying fish was so offensive that it ought to be prohibited. Mr. C. E. Abbott (medical officer of health to the Rural Sanitary Authority) gave similar evidence. The chairman said that two medical practitioners had given evidence that the smell was offensive, and should be abated. The Bench inflicted a nominal penalty—*6d.* and costs. Mr. Jones, defendant's solicitor, gave notice of appeal.

HOW TO PROCEED WITH UNHEALTHY DWELLINGS.

George Peatrell, the owner of Nos. 15, 17, and 21, Mint Street, was summoned by Mr. Edwards, one of the sanitary officers of St. George's, for neglecting to cleanse and put in proper repair those houses. Mr. Edwards said that the defendant rented the houses from the superior landlord, put a little furniture in each room, and let them out as furnished rooms by the night or week. Finding them in a very dirty state, he (Mr. Edwards), in company with Dr. Waterworth, the medical officer of health, inspected them and found the walls and ceilings dirty and ruinous, the floors filthy, and in such a state as to be injurious to the health of the inhabitants. He saw the defendant, and pointed out to him the filthy condition of the rooms, and he promised to put them all in proper repair. The defendant said that he was only a weekly tenant, and he considered that the landlord was the person who ought to be summoned. Mr. Bridge fined defendant *20s.* and costs for each house, making in all *3l. 6s.*

LIABILITY OF LOCAL AUTHORITIES.

A case of interest both to local authorities and the public has been heard at the Bury County Court. Mr. Mellor, a county magistrate, residing at Prestwich, was being driven home from Bury after a volunteer gathering; the night was very dark, and the coachman drove against the post of an unlighted street lamp, fixed at a corner sixteen inches from the kerbstone, with the result that Mr. Mellor's horse and brougham were much damaged. Mr. Mellor now brought an action against the corporation of Heywood, as the lighting authority, to recover *30l.* damages, contending that it was their duty to have

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lighted the lamp, which was in a dangerous position. There was a plea of contributory negligence, and also an argument in defence that the lighting powers of the corporation were permissive and not compulsory. The judge, however, decided against the corporation. It was their duty, he said, to carefully exercise powers conferred on them to light street lamps, especially on dark nights, and he gave a verdict for the sum claimed. Notice of appeal was given.

WATER COMPANIES' CHARGES.

Mr. Justice Mathew and Mr. Justice Day, sitting in the Queen's Bench Division, have heard an appeal by the New River Company against the decision of a magistrate who held that the New River Company were not entitled to charge the water-rate on the annual value of the whole of the premises in the occupation of Mr. George Barham; including the stable, coachhouse. and garden, but only on the 'dwelling-house,' thus reducing the annual value for water-rating purposes from 168*l.*, the amount charged by the company to 120*l.*, and the annual payments from 11*l.* 4*s.* to 8*l.* 16*s.* The appeal was dismissed, with costs against the New River Company.

An important test case has been brought at Northampton against the local water company in the police-court by a Mr. Robert Reid, who claimed 2*s.* 7*d.* overpaid as rate, and 10*s.* for breach of contract. The case arose out of the water famine, and was regarded with great interest. The bench, however, nonsuited the plaintiff, on the ground that there was no written contract.

BRIEF NOTES OF USEFUL CASES.

HIGHWAY.

1882. *A. G.* v. *Shrewsbury* (*Kingsland*) *Bridge Co.* When an illegal act is being committed (such as an interference with a highway or navigable stream) the Attorney-General can maintain an Action, and an Injunction will be granted, even although no evidence of actual injury is given. (L.R. 21 Ch.D., 752.)

1883. *Bolton* v. *Bolton Corporation.* 'Public Health Act, 1875,' § 150—Evidence to prove dedication of highway. (At Q. Sess.) (47 J.P., 505.)

POLLUTION OF STREAM.

1883. *Charles* v. *Finchley L.B.* Action against Board for not prosecuting a third party polluting a stream held maintainable, the third party, being under contract with the board, and having failed to comply with the conditions of his contract—*Glossop* v. *Heston* and other analogous cases distinguished. (52 L.J., Ch., 554: L.R., 23 Ch.D., 767: 48 L.T., 569.)

RATING OF RAILWAY.

1883. *Cheshire Lines Committee* v. *Altrincham Union.* Rating of railway where statutory restrictions exist on tolls payable by another company having running powers. (At Q. Sess.) (47 J.P., 681.)

ADULTERATION OF FOOD.

1883. *Gage* v. *Elsey.* 'Sale of Food Act, 1876.'—Vendor of gin adulterated with 40 per cent. of water held not punishable under the Act, ample notice having been given that quality was not guaranteed. (52 L.J., M.C.; 44 L.R., 10 Q.B.D., 518; 48 L.T., 226; 47 J. P., 116.)

DRAINAGE RATE.

1848. *Harrison* v. *Stickney.* Local Drainage Act—There is no rule of law which prohibits a retrospective rate—The question is always whether the Act under which the rate is levied prohibits a retrospective rate. (2 H.L.C., 108.)

RATING OF RAILWAY.

1883. *London and North Western Railway Company* v. *Chapel-en-le-Frith Assessment Committee.*—Railway used solely for mineral traffic. (At Q. Sess.) (47 J.P., 505.)

COMMONS.

1882. *Morley* v. *Clifford.* The rights of a commoner to turn out cattle must be held to be subject to certain restrictions—Claim of right to turn out an unlimited number of cattle held not sustained. (L.R., 20 Ch. D., 753; 30 W.R., 606.)

APPEAL TO QUARTER SESSIONS.

1882. *Reg.* v. *Esser, JJ.* An appellant seeking relief and getting none because declining to produce certain books of account called for by an Assessment Committee, is not on that account to be debarred from the advantages of an appeal to Q. Sess. (46 J.P., 724.)

STREET PAVING.

1883. *Reg.* v. *Sheffield, Recorder...* 'Public Health Act, 1875.'—Bad notice to pave—Justices not on that account without jurisdiction to enforce paving expenses—Persons wrongly charged should have appealed. (52 L.J., M.C., 78; 47 J.P., 504; [*Wake, ex parte*] L.R., 11 Q.B.D., 291.)

OBSTRUCTION OF STREET.

1883. *Reg.* v. *Young.* Local Act—Alleged obstruction of a street—Claim of right to use the ground as not being part of a public way—Held that the jurisdiction of the Justices was not ousted, but that they might determine whether the *locus in quo* was public or private. (52 L.J., M.C., 55; 47 J.P., 519.)

LIABILITY OF ASSESSMENT COMMITTEE.

1883. *Richardson* v. *Madeley Union.* An Assessment Committee is not liable for expenses incurred by its valuer without its express authority. (46 J.P., 439.)

THE HOUSING OF THE POOR.

THE question of the housing of the poor has been raised in the Austrian Parliament by a motion to exempt from the heavy house-tax lodgings of which the rent is under 14*l.*, and to give State facilities to societies formed for the erection of healthy artisans' dwellings. Vienna, like all large towns, has slums and rookeries, in some cases worse than any in London, but improvement seems impossible owing to the enormous house-tax, which is over 35 per cent. on the rent.

THE ARTISANS' AND LABOURERS' DWELLINGS ACTS. Returns have been published, pursuant to an order of the House of Commons, giving particulars of the areas proposed to be dealt with under the Artisans' and Labourers' Dwellings Acts. The returns are made by the Commissioners of Sewers, the Metropolitan Board of Works, and certain urban sanitary authorities, and they show the number of official representations that have been made to those bodies in regard to sites that might fitly be improved, the stage reached by each improvement scheme that has been undertaken, and its estimated cost. Similar returns have been furnished from Ireland and Scotland. By order of the Court of Common Council, a return has been published showing the steps taken by the Corporation and the City Commissioners of Sewers to provide improved dwellings for the labouring poor. From this return it appears that the Corporation of London first directed their attention to the subject in the year 1851. In that year the Improvement Committee of the Court of Common Council acquired and cleared ground suited for labourers' dwellings at an expense in all of 30,519*l.* Estimates of the cost of the erection of the buildings were prepared, but the ground acquired by the Court was taken compulsorily under the Act of Parlia-

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ment for constructing the Metropolitan Railway, and delay consequently resulted. Ground was then acquired in the neighbourhood of the Farringdon Road, and a contract was entered into in the year 1869 for the erection of four blocks of buildings to be called 'Corporation Buildings,' at a cost, including the site, of 54,568*l*. Additions were subsequently made, raising the total cost to 59,783*l*. These blocks accommodate 846 persons. The corporation in the years 1866–67 further appropriated two buildings, designed for hotels, at the Metropolitan Cattle Market at Islington, and adapted them for lodging-houses for the artisan class, at a cost, including the estimated value of the site, of 33,000*l*. In these buildings 160 persons are accommodated. Under the Acts for making the Holborn Valley Improvements, the corporation subsequently obtained powers facilitating the acquisition of land on which to erect dwellings for the poor. The amount expended under these Acts in the provision of the dwellings termed 'Viaduct Buildings,' including the value of the site, has been 13,023*l*., and the number of persons accommodated is 585. To the City Commissioners of Sewers no official representations respecting sites in the City have been made since May, when they furnished a return. In anticipation of the receipt from the Regent's Canal and City and Docks Railway Company of the purchase-money for the ground which has been cleared on the Golden Lane site, they have contracted for and begun the erection of dwellings on the Petticoat Square site at a cost of 65,500*l*.

Outcast Windsor.—At the parish church of Holy Trinity, Windsor, the rector, the Rev. Arthur Robbins, chaplain to the Queen and the Prince of Wales, preaching to a very large congregation, upon some of the worst aspects of many of the so-called homes of the poor, said that 'the bitter cry of outcast London' has also its harsh echo in the slums of outcast Windsor. Before all other questions of national concern, however pressing, this one should peremptorily have a first call upon all philanthropists and statesmen. Within 400 yards of the Throne Room in Windsor Castle there were scenes of unloveliness that made the heart sick, amidst the too congenial surroundings of dilapidation and dirt. He would like to take Mr. Gladstone or the President of the Local Government Board, when next they came to Windsor upon State affairs, to see some of the rookeries of Royal Windsor, where the poor, long-suffering and uncomplaining, had many of them to herd in pigstye dwellings, and were too often housed no better than the swine.

Reporting on a number of houses situated near High Street, Peckham, the medical officer of St. Giles's, Camberwell, says:—'All these houses are badly constructed and arranged, and have gradually for many years past been getting more hopelessly decaying, and more and more becoming unfit for human habitation. They are mostly wooden structures, old, rotten, badly ventilated, and impossible of good ventilation. There can be no doubt they ought to be demolished, and that the only available way of having them demolished is to proceed under Torrens's Act. If they are demolished certain other old wooden houses in High Street adjoining them ought to be demolished. The sanitary condition of Camberwell, and the action of the local authorities in reference to it, will also come before the vestry at their next meeting by means of the following resolution, to be proposed by Mr. Middlemass:—'That with the view of enabling the parishioners to form a judgment as to the action of the vestry in the administration of the several Acts of Parliament relating to nuisance, drainage, the preventing of disease, overcrowding, and sanitary regulations, the surveyor and medical officer, with the assistance of the persons acting under their direction, be requested to prepare a return for a period of seven years, or such longer period as they may think proper, showing the totals of inspections, complaints, notices, orders, summonses, cases before the magistrates, and the penalties; and that each officer be requested to append to the report such observations as he thinks necessary to inform the public of the difficulties experienced in carrying out the provisions of the Acts of Parliament.'

The Local Government Board has requested the Clerkenwell Vestry to consider the question of taking steps, under the Artisans' and Labourers' (Torrens's) Act, in relation to those unhealthy areas in the parish referred to in the official representation made to the Metropolitan Board of Works by the district medical officer of health, Dr. Griffiths, with respect to which the Metropolitan Board has decided not to prepare improvement schemes because of the small size of the areas.

Paris has, through her municipal council, abolished house taxes on apartments renting for 25*l*. or less, the deficiency being made up by increasing the tax on apartments renting above that sum.

At the monthly meeting of the Newcastle, Gateshead, and District Trades Council, held on the 5th, it was stated that the important subject of dwellings for the poor is to be taken up by the Council, they being of opinion that a scheme for this object ought to originate from the working classes. The sturdy and independent Northerners are taking the correct initiative in the matter.

PARKS AND OPEN SPACES.

Playgrounds for Children.—The committee of the Manchester and Salford Sanitary Association, having forwarded to the Vice-President of the Council a copy of a memorial presented to the Manchester Corporation, urging the provision of suitable playgrounds for children, have received the following reply, dated the Education Department, Whitehall, January 2, and signed P. Cumin:—'I am directed to state that the Vice-President has carefully read your memorial, and it has long been the policy of the Department to require a playground to be attached to a school, especially to an infant school, and in every case in which loans are made to School Boards for the purpose of providing schools the Department always require that there shall be a playground, although in very crowded town districts the cost of obtaining land for the purpose is often very serious, and if there are any school-houses now under the jurisdiction of School Boards which are without playgrounds, my Lords will have much pleasure in giving every encouragement to School Boards if they propose to supply them.'

The Surrey magistrates have agreed that the site of old Horsemonger Lane Gaol should be let at the nominal rental of 5*s*. per annum to the Metropolitan Public Garden and Playground Association, with a view to its being opened as a recreation ground. The committee appointed to report on the subject recommended that the application be acceded to on certain conditions, among which are the following. That the Association construct and maintain a substantial close fence round the land; that the recreation ground be closed at any time that the sessions committee or chairman of the court shall deem desirable; that at all times when the ground is open to the public a caretaker shall be employed, and that the Association shall covenant to give up possession at any time on three months' notice.

SANITARY JOTTINGS.

SANITARY.

The *Sanitary News* of Chicago reports that, by a majority vote, the city Council has ordered the mayor to enforce the smoke abatement ordinance.

From the same source we learn that a Bill has been introduced in the Mexican Congress making compulsory the cremation of all bodies dead from yellow fever.

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Messrs. Woodward & Grosvenor, of Kidderminster, are the first firm who have introduced the electric light into carpet works. Their Axminster mill and connected premises are lighted with incandescent lamps with very satisfactory results.

In commenting on the circumstances attending an outbreak of small-pox at Bolton, Mr. Sergeant gives some curious instances illustrating the manner in which infection may be spread. In one case the disease seemed to follow the distribution of tracts from infected houses to houses free of the disorder; and another case occurred where the possibility of catching the disease from reading a letter written by a patient suffering from small-pox presented itself.

A memorial has been presented to the Town Council of South Shields at their last meeting, praying that steps be taken to close the Tyne alkali works in consequence of the nuisance arising therefrom.

Several colliery proprietors have been summoned before the magistrates of the county of Durham for neglecting to provide water-closets or other conveniences to the houses of their workmen.

Among the places recently reported for smoke nuisance are the General Post Office and the Bank of England.

WATER SUPPLY.

Mr. J. W. Restler, late assistant engineer, has been appointed engineer-in-chief to the Southwark and Vauxhall Water Company, in succession to the late Mr. Rumble.

It was stated at the half-yearly meeting of the Chelsea Waterworks Company that the directors had determined loyally to accept the decision in the Dobbs case, which, it was believed, would not materially diminish the income of the concern.

SEWERAGE.

The Dorking Local Board have received the sanction of the Local Government Board to borrow 13,000*l.* for works of sewerage and sewage disposal. The whole of the Local Board district will be sewered by gravitation, and upon the separate system. The mode of treatment of the sewage will be by precipitation on 'Hanson's' process, as at Golcar and Aldershot, but with the addition of subsequent land filtration. The area of the site to be used for outfall works consists of 10½ acres. The population of Dorking is nearly 7,000.

Mr. Willet, C.E., Aberdeen, has been appointed consulting engineer in connection with the proposed new drainag scheme for Inverness, which is estimated to cost 10,715*l.*

The inauguration of the recently completed works of sewerage and sewage disposal for Wigton, Cumberland, has lately taken place. The works were designed in 1879 by Mr. John S. Hodgson, C.E., Hexham, and include a complete separate system of new surface-water sewers and street-gullies, the subsoil drainage of the site of the town being likewise separately provided for. The system of sewage purification adopted is irrigation and intermittent downward filtration upon a total area of about twelve acres. The total cost of the works, including purchase of land, has been about 8,600*l.* Mr. Thos. Bennett acted a clerk of works throughout.

THE DRAINAGE OF BRENTFORD.—The new works for the drainage and disposal of the sewage of the county town of Middlesex have just been completed at a cost of about 30,000*l.* They have been designed by Messrs. Gotto and Beasley, of Westminster. The sewage is pumped from a collecting well in the town meadow to the sewage tanks on the Ealing Road, a distance of more than a mile; and it is deodorised and precipitated by the mixture of lime and sulphate of alumina, the effluent water being discharged into the river by an effluent culvert along the line of Claypond's Lane. The sludge is dried by means of flues constructed under the tanks, and is run out by a small tramway. The Brentford Local Board have expressed themselves as thoroughly satisfied with the way in which the works have been carried out and completed.

CORRESPONDENCE.

[All communications must bear the signature of the writer, not necessarily for publication.]

TRAP VENTILATION AND SYPHONAGE.

IN your issue of Dec. 15, 1883, I notice that Mr. Gilbert Thomson, of the Glasgow Sanitary Protection Association, has been experimenting with traps fixed below water-closets, and some of them appear to have been of the form known as 'P' or 'S' traps. Mr. Thomson's description appears to require fuller explanation, and I hope he will reply to the following queries:—1. Was the 3-inch ventilating pipe fitted exactly as shown in the illustration, and in what manner was the opening increased to 4-inch? 2. Was there any cap, ventilator, or cowl upon the 3-inch pipe, or finally, upon the 4-inch pipe? 3. When the syphonage of the closet trap (a 4-inch one I presume it to have been) was reduced by plugging up the 1½-inch ventilating pipe on the closet side of the trap below the valve, was the effect of this on the trap of the overflow noticed? I believe the latter will have been syphoned under such conditions; and in the event of the regulator closing too soon, that is, before the after-flush had filled the basin above the overflow holes, which I find to be often the case, there would be a free passage for impure air direct into the house.

There are other causes well known to most sanitarians, besides syphonage, which do not appear to have been taken into account, but which your correspondent perhaps failed to observe, or which may have escaped his notice in the same manner as it had with others until quite recently.

11 Billiter Square, E.C. A. E. HUBERT.
Dec. 21, 1883.

[I have been favoured with a proof of Mr. Hubert's letter. In reply to his queries—1. The illustration is a correct sketch (not to scale), and the pipe was increased to 4-inch by cutting a larger opening in the top of the trap, and substituting a 4-inch for a 3-inch pipe. 2. There was no cowl or ventilator, properly so called, but on both pipes there was a guard of very open construction, as a protection against accidental stoppage. Of course, where the pipe was cut it was left quite open. 3. The overflow trap was not specially tested, but I do not think it syphoned here, though I agree with Mr. Hubert that this is a very common occurrence. The closet-trap was a 4-inch one. If Mr. Hubert will refer to my original note he will sse that he is hardly correct in saying that I have been 'experimenting with *traps*.' I merely reported one case which occurred, not in the course of experiment, but in ordinary practice. In calling attention to a possible danger, I am of course not to be understood as objecting to trunk ventilation, but it must be borne in mind that there is a wide difference in point of danger between impure air from a closet-trunk and impure air from the soil-pipe or drain. GILBERT THOMSON.
45 West Nile Street, Glasgow.]

TRAP VENTILATION AND SYPHONAGE.

The experiment set forth in Mr. Gilbert Thomson's letter upon the above subject, in your issue of December, is most interesting, and fully confirms the opinion I expressed in my brief paper upon 'The Influence of Storms upon Water Traps,' in the SANITARY RECORD of April last, and his remark that the long 3-inch pipe was cut away to reduce friction, strikes at the root of the evil.

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The syphoning of the main trap was caused by friction upon the air in the long 3-inch pipe; for this pipe would not supply air with sufficient rapidity to prevent a vacuum at the soil pipe side of the trap, caused by the descent of the flush water.

In my early days I was much interested with an account of a series of experiments upon air friction, made with the empty pipes intended to be used for the Paris water supply, and I regret that I cannot refer to it now; but, so far as my memory serves me; to a long length of 10-inch pipe, open at each end, powerful pumps for compressing and exhausting air, were applied, and with the following results. When the air was forced into one end of the pipe no perceptible effect could be discovered at the other end, and a lighted taper passed through the fire plug holes opened in succession, proved that the air motion was gradually lost, the further the plug holes were from the pumping power, and an attempt was made to exhaust the air from the pipes, and with similar results.

Since the above experiments were tried, an attempt to work a railway in Devonshire by atmospheric agency failed; because the air could not enter the tubes sufficiently fast to supply the vacuum caused by the powerful exhausting engines, and the train gradually came to a standstill.

The 3-inch air-pipe of Mr. Thomson's closet is rather long, and in my opinion if the lower half of the new pipe had been 4-inch, and the upper half 5-inch, the result would have been more to be relied on.

Mr. Thomson says nothing about the effect produced upon the closet overflow trap water, during the time of pipe plugging. Probably the syphoning of the main trap was prevented by a small supply of air through this overflow, which retarded the water, and also destroyed the temporary vacuum which would have been otherwise formed, for with a well-fitting valve closet, and well jointed pipes, the air must come from somewhere, or the water would not descend. In unventilated pipes the descent water occupies, say, one-half of the pipes, and air ascent the other half, and a vacuum is thus prevented, and motion secured.

Bristol. HENRY MASTERS.

TINNED FOOD.

I am a strong and robust man, very regular in my habits, and avoid excesses in any form, and yet last Saturday night was one of the most miserable I ever spent—constantly dozing off, and in a short time starting up in bed wide awake, and in the morning I had an intense pain and throbbing from one side to the other of my head, across the temples, a soreness in my throat, and a pain in my neck, and my muscular powers were reduced so much that, to move about or lift my hands was a trouble, and the pain in my head and neck continued next day and night, and sleep was equally miserable, and also Monday night, but the days and nights since were better, and now the attack has passed off, but I feel somewhat weak. The above were my symptoms, and the first question was, where had I been, and what had I eaten? and upon a very careful analysis of my doings for a week or two, I came to the conclusion that I had kept clear of contagion, and had eaten or drunk nothing unusual, except that on Saturday I partook of about an ounce and a half of tinned salmon from a fresh-opened can, and that other members of my family partook of it with no bad results, but I fear that the salmon I ate contained something that produced my illness, so have investigated the fish and also the material that formed the cases of this class of food, and find that a thin iron case is coated with a composition, consisting of about one part tin, and two parts lead, and also that it was soldered together with a similar material, probably some acid being used to facilitate rapidity of soldering. One hears so much nowadays about lead poisoning, that I am anxious to know if I have been suffering from this sort of thing, and, if so, how is it my family were not attacked as well as myself. In mentioning this to a very intelligent plumber, he informed me that upon occasion he had a similar attack under somewhat similar circumstances, and he told me that poor people collect the cans from scavengers' yards, burn them, and extract solder from them, and he has purchased many hundredweights of such solder, and he found that it is a very inferior metal, containing not more than one-third pure tin. (See page 364.)

If I am right in my theory, I consider that this subject should be thoroughly investigated in your journal, *pro bono publico*, and probably it may reach the merchants who pack in tin cases so-called, and the sooner the dangerous and mischievous system is exposed the better for the health of would-be tinned-salmon eaters and others.

We all know the effects occasionally caused by the lead tank upon drinking water, and I take it that food packed closely in lead-lined packages (for one cannot call these receptacles tin-lined) stand the chance of absorbing lead, as water in lead tanks is known to do.

Bristol, Jan. 9, 1884. HENRY MASTERS.

THE DWELLINGS OF THE LONDON POOR.

The following letters have passed between the Council of the Royal Institute of British Architects and Mr. Mark H. Judge, one of the directors of the Artisans', Labourers', and General Dwellings Company, the largest owners of improved cottage dwellings in the world:—

'8 Park Place Villas, W., Dec. 12, 1883.

'John Macvicar Anderson, Esq., Honorary Secretary and
'William Henry White, Esq., Secretary, of the Royal Institute of British Architects.

'Dear Sirs,—The important question of the condition of the habitations of the underpaid industrial classes and the abject poor, who may be described as the children of the community, inasmuch as they are powerless to help themselves, is now fortunately attracting the earnest attention of the public, and it therefore becomes of the utmost importance that reliable data should be forthcoming in order that the desire to improve the present state of things may bear fruit in wise action before the present wave of just indignation has spent itself.

'I therefore venture to suggest to the Council of the Institute whether they would not be fulfilling a most important public duty at the present juncture if they could be the means of obtaining this reliable data. The question is one which cannot be solved without the knowledge and experience of the profession, and I beg therefore to ask the Council to consider the following proposal, viz., that the Royal Institute of British Architects appoint a special committee to inquire into, and report on, the condition of the dwellings of the London poor.

'I am, dear Sir, yours faithfully,
'MARK H. JUDGE, Associate.'

'Royal Institute of British Architects,
'9 Conduit Street, Hanover Square, London, W.,
'Dec. 20, 1883.

'Mark H. Judge, Esq.

'Dear Sir,—We duly submitted to the Council of the Royal Institute of British Architects your letter of the 12th inst., in which you suggest that the Institute should appoint a special committee to inquire into and report on '*the condition of the dwellings of the London poor.*' We are to state in reply that, however much the Council may concur in the general wish to ameliorate the condition of those dwellings, the means at the disposal of the Institute for such a purpose are too small to penetrate the mass of difficulties which surround the question.

'A generation ago a member of the Council made a noble effort to call public attention to the then state of things, and those efforts have been since renewed from time to time. Persons in authority, just awakened to the facts of the position, may perhaps be astonished at finding so much already done by Mr. George Godwin to throw light upon a subject which at last appears to have been taken up in earnest. Indeed, the probability of an almost immediate appointment of a Royal Commission to inquire into the condition of the dwellings of the poorest classes in London, is perhaps a proof of the magnitude of the task which you invite the Institute to undertake—a task which seems to us to concern the metropolis at large, and to be the duty of a responsible Government to organise and carry through.

'We are, dear Sir, yours faithfully,
'J. MACVICAR ANDERSON, *Hon. Secretary.*
'WILLIAM H. WHITE, *Secretary.*'

NOTICES OF MEETINGS.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

THE remaining meetings of the Session 1883-84 will be held on January 18, at 7.30 P.M., February 15, March 21, April 18, May 16. The annual meeting will be held in July, of which notice will be given.

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THE PARKES MUSEUM.

Jan. 17, 8 P.M.—Lecture by Mr. Pridgin Teale, of Leeds, on 'Economy of Coal in Private Houses.' Jan. 31, 8 P.M.—Lecture by H. A. Darbishire, F.R.I.B.A., on 'Artisans' and Labourers' Dwellings.' Feb. 12—Lecture by J. P. Seddon, F.R.I.B.A., on 'The Ventilation of Theatres.'

At a meeting of the Council, held on Jan. 8, Dr. G. V. Poore in the chair, the following gentlemen were duly elected as Members:—Sir James Paget, Bart., D.C.L., F.R.S.; H. A. Darbishire, F.R.I.B.A.

COMPETITIONS.

THE SHAW PRIZE.

THE Gold Medal, or £20, offered by the Council of the Society of Arts under the terms of the Shaw Prize, for the best plan for obviating or diminishing risk to life in the operations of coal mining, has been awarded by the Council to Mr. H. A. Fleuss, for his apparatus enabling persons to breathe in mines and other places filled with vitiated air or irrespirable gas.

APPOINTMENTS UNDER THE PUBLIC HEALTH ACT.

MEDICAL OFFICERS OF HEALTH.

AITCHISON, James, L.R.C.P. Edin., L.R.C.S. Edin., has been re-appointed Medical Officer of Health for the Wallsend Urban Sanitary District, Northumberland, at £50 for the year ending Dec. 25, 1884.

ANDERSON, Dr. William Hewetson, has been appointed Medical Officer of Health for the Hoxne Rural Sanitary District, Suffolk, at £60 for one year, from March 25 next, *vice* Pretty, resigned, and since deceased.

ARBUCKLE, Hugh Wight, M.D.Univ.Aberd., L.R.C.P.Edin., L.F.P.S.Glasg., has been appointed Medical Officer of Health for the Thorne Rural Sanitary District, Yorkshire, at £70 for one year, *vice* the poor-law district Medical Officers whose appointments have expired.

ASHWORTH, James Henry, L.R.C.P. Edin., and L.M., F.F.P.S. Glasg., L.S.A. Lond., has been appointed Medical Officer of Health for the first division of the Halstead Rural Sanitary District, Essex, at £44 per annum (in addition to £90 per annum and fees as Medical Officer and Public Vaccinator for the first district and the Workhouse of the Halstead Union), *vice* Hinds, deceased.

BILLIARD, Richard Atherstone, L.R.C.P.Lond., M.R.C.S.Eng., has been appointed Medical Officer of Health for the Kington Urban Sanitary District, Herefordshire, until March 31 next, *vice* Foote, resigned from ill-health (and upon the same terms).

CLARK, James. M.D.Univ.Aberd., F.R.C.S.Edin., has been appointed Medical Officer of Health for the Lichfield Rural Sanitary District, at £100 per annum, *vice* Monckton, resigned.

COATES, Frederick William, M.D.Univ.Edin., has been re-appointed Medical Officer of Health for the Salisbury Urban Sanitary District, at £60 per annum, for three years from 15th inst.

DUMMERE, Howard Howse, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Ecclesall Bierlow Rural Sanitary District, Yorkshire, at £30 for one year.

HARTT, Charles Henry, L.K.Q.C.P. Irel. and L.M., L.R.C.S. Irel., has been appointed Medical Officer of Health for the Greenwich Division of the Greenwich District, at £100 per annum, *vice* Pink, resigned.

HARVEY, William, F.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Dawlish and Wolborough Urban, and the Newton-Abbot Rural, Sanitary Districts, combined, at £350 per annum, until Michaelmas 1886, *vice* Armstrong, resigned.

KINGCOMBE, Alfred Dartridge, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Towcester Rural Sanitary District, Northamptonshire, at £40 for one year, *vice* Cresswell, resigned.

LODGE, Samuel, L.R.C.P.Edin., M.R.C.S.Eng., has been re appointed Medical Officer of Health for the Tong Urban Sanitary District, Yorkshire, at £25 for one year.

LOWE, John, L.R.C.P.Edin. and L.M., L.R.C.S.Irel., has been appointed Medical Officer of Health for the Workington Urban Sanitary District, Cumberland, at £60 per annum, *vice* Hogg, deceased.

MACLACHLAN, Dr. Samuel French, has been re-appointed Medical Officer of Health for the Longtown Rural Sanitary District, Cumberland, at £60 for the year ending Dec. 25, 1884.

MADDEVER, John Coombe, M.D., has been appointed Medical Officer of Health for the Brownhills Urban Sanitary District, at £40 per annum, *vice* Flinn, resigned.

MOORE, Charles Arthur, M.D.Univ.Aberd., M.R.C.S.Eng., L.S.A. Lond., has been re-appointed Medical Officer of Health for the Barrow-on-Soar, Billesdon, Blaby, Hinckley, Lutterworth, Market Bosworth, Oakham, and Uppingham Rural Sanitary Districts, and the Melton Mowbray and Thurmaston Urban Sanitary Districts, combined, at £550 per annum for three years, from Dec. 25, 1883.

MUMFORD, William Ellis, L.R.C.P.Edin., L.R.C.S.Edin., has been re-appointed Medical Officer of Health for the Pudsey Urban Sanitary District, at £30 for one year.

ROBERTS, Henry William, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Deptford Division of the Greenwich District, at £150 per annum, *vice* Pink, resigned.

ROBINSON, Dr. M. K., has been re-appointed Medical Officer of Health for the Blean, Bridge, Dover, East Ashford, Eastry, Elham, Thanet, and West Ashford Rural Sanitary Districts, and the Dover, Herne Bay, Hythe, and Broadstairs Urban Sanitary Districts, combined, at £900 per annum, for life.

SHEA, John, B.A.Univ.Lond., M.D.Univ.S.And., M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the combined Reading and Wokingham Rural and Urban Sanitary Districts, at £300 per annum for three years.

THOMAS, William Lanham, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Horsham Urban Sanitary District, at £15 for the year ending Dec. 25, 1884, *vice* Ashburner, deceased.

VLIELAND, Charles James. M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the St. Thomas Urban Sanitary District, Devonshire, at £20 for one year.

SURVEYORS, CLERKS TO GUARDIANS, INSPECTORS OF NUISANCES, &C.

BAIRD, General, has been elected a Member of the Surbiton Board of Improvement Commissioners and Urban Sanitary Authority, *vice* Cockburn, resigned.

BEVIR, Mr. Henry, Solicitor, has been appointed Clerk to the Cricklade and Wootton Bassett Guardians and Rural Sanitary Authority, at £100 per annum as Clerk to the Guardians, and such further remuneration as Clerk to the Rural Sanitary Authority, to the Assessment Committee, and to the School Attendance Committee, as may be fixed at the end of each year, and fees as Returning Officer, *vice* Dodd, resigned.

BLANCHARD, Mr. Thomas John, has been re-apointed Inspector of Nuisances for the Evesham Urban Sanitary District, at £70 for one year.

CALLANDER, Mr. Robert, has been elected a Member of the Carlton Local Board and Urban Sanitary Authority, Nottinghamshire, *vice* Slingsby, resigned.

CLARK, Mr. James, has been elected a Member of the Bingley Board of Improvement Commissioners and Urban Sanitary Authority, *vice* Anderton.

COPE, Mr. Francis James, has been elected a Member of the Darlaston Local Board and Urban Sanitary Authority, *vice* Green, deceased.

CRABTREE, Mr. Richard, has been re-appointed Clerk to the Hebden Bridge Local Board and Urban Sanitary Authority, at £62 per annum.

DUFF, Mr. Robert J., has been appointed Assistant Surveyor to the Corporation and Urban Sanitary Authority of Doncaster, at £150 per annum.

DUNN, Mr. William, has been elected a Member of the East Dereham Local Board and Urban Sanitary Authority, *vice* Gibbs, resigned.

ELLGOOD, Mr. Samuel, has been elected a Member of the St. Neots Local Board and Urban Sanitary Authority, Huntingdonshire, *vice* Wright, deceased.

ETCHES, Mr. William Baker, Solicitor, and Deputy Clerk, has been appointed Clerk to the Whitchurch and Dodington Local Board and Urban Sanitary Authority, Salop, *vice* Clay, resigned. (The salary is to be fixed at a future meeting, some of the members considering that the late clerk was insufficiently paid.)

GOLDSMITH, Mr. Samuel, has been re-appointed Surveyor and Inspector of Nuisances to the Urban Sanitary Authority of Wallingford, at salaries amounting to £52 per annum, for three years.

GOULBOURN, Mr. J. B., has been appointed Clerk, Inspector of Nuisances, and Collector to the Little Lever Local Board and Urban Sanitary Authority, at £40 per annum, *vice* Empsall, appointed Clerk, &c., to the Church Local Board and Urban Sanitary Authority.

GREEN, Mr. John, has been appointed Surveyor, Inspector of Nuisances, and Collector to the Uckfield Local Board and Urban Sanitary Authority, at £50 per annum, *vice* Avis, deceased.

HARDWICKE, Mr. Arden, Assoc.Mem.Inst.C.E., has been appointed Surveyor to the Corporation and Urban Sanitary Authority of Walsall, at £250 per annum, *vice* Boys, deceased.

HIRON, Mr. John Eden, Solicitor, has been appointed Clerk to the Shipston-on-Stour Guardians and Rural Sanitary Authority, at £80 per annum as Clerk to the Guardians, and such further remuneration as Clerk to the Rural Sanitary Authority, to the Assessment Committee, and to the School Attendance Committee, as may be fixed from year to year, and fees as Returning Officer, *vice* Mr. Thomas Eden Hiron, deceased.

HOPE, Mr. James, has been re-appointed Inspector of Nuisances for the High sub-district of the Longtown Rural Sanitary District, Cumberland, at £15 for the year ending Dec. 25, 1884.

HUDSON, Mr. Charles James, of the Town Clerk's Office, Gloucester, has been appointed Town Clerk and Solicitor, and Clerk to the Corporation and Urban Sanitary Authority of Wakefield, at £500 per annum, *vice* Morgan, deceased.

KNOWLES, Mr. William, has been elected a Member of the Matlock Local Board and Urban Sanitary Authority, *vice* Wright resigned.

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LEIGH, Mr. William, has been appointed Surveyor to the Corporation and Urban Sanitary Authority of Chorley, at £200 per annum, *vice* Derham, resigned.

MAIR, Mr. Hugh, late Assistant Surveyor to the Corporation and Urban Sanitary Authority of Kingston-upon-Hull, has been appointed Surveyor to the Corporation and Urban Sanitary Authority of Hartlepool, at £250 per annum, *vice* Morris, resigned.

MEIR, Mr. A. C., has been elected a Member of the Tunstall Local Board and Urban Sanitary Authority, *vice* Eardley, deceased.

ROBINSON, Mr. Frank Miller, of the Alfreton Branch of Messrs. Crompton and Evans's Bank, has been appointed Treasurer to the Alfreton Local Board and Urban Sanitary Authority, Derbyshire, *vice* Hall, resigned.

SKINNER, Mr. Joseph, has been re-appointed Inspector of Nuisances for the Tenterden Urban Sanitary District, at £20, for one year, from Sept. 29 last.

SKIPPER, Mr. Uriah, has been elected a Member of the East Dereham Local Board and Urban Sanitary Authority, *vice* Elvin, resigned.

SLACK, Mr. E., has been elected a Member of the Matlock Local Board and Urban Sanitary Authority, *vice* Cooper, resigned.

SMITH, Mr. George Edward, has been appointed Inspector of Nuisances for the Amersham Rural Sanitary District, at £75 per annum from year to year, and £25 per annum until Chesham is constituted a Local Government district, *vice* Jefferies, resigned.

SPENCE, Mr. Alderman J. F., has been re-elected Vice-chairman of the Tyne Port Sanitary Authority for the ensuing year.

STUBBS, Mr. J., has been appointed Clerk to the St. George Local Board and Urban Sanitary Authority, Gloucestershire, at £100 per annum, and £40 per annum as Clerk to the Burial Board, *vice* Parry, deceased.

SUTHERLAND, Mr. Martin, has been re-appointed Inspector of Nuisances for the Low sub-district of the Longtown Rural Sanitary District, at £20 for the year ending Dec. 25, 1884.

SWIFT, Mr. Thomas, has been reappointed Inspector of Nuisances for the Oakham Rural Sanitary District, Rutlandshire, at £15 for one year.

SUNDERLAND, Mr. Henry, has been elected a Member of the Matlock Bath and Scarthin Nick Local Board and Urban Sanitary Authority, Derbyshire, *vice* Peters, resigned.

THOMAS, Mr. Evan, has been appointed Inspector of Nuisances and School Attendance Officer for the Llanfyllin Rural Sanitary District, at £80 per annum as Inspector of Nuisances, and £40 per annum as Attendance Officer, such salary to include the keep of a horse, from year to year, *vice* Lloyd, deceased.

TREADWELL, Mr. William Johnson, has been appointed Inspector of Nuisances and School Attendance Officer for the Brackley Rural Sanitary District, Northamptonshire, at £52 and £20 per annum, *vice* Barrows, resigned, in consequence of other arrangements made in the Union.

TREDWELL, Mr. Solomon, has been appointed Working Surveyor to the Sandown Local Board and Urban Sanitary Authority, at £75 per annum, *vice* Newman.

TURNBULL, Mr. Edward, has been re-elected Chairman of the West Hartlepool Board of Improvement Commissioners and Urban Sanitary Authority for the ensuing year.

VENNELL, Mr. G., has been elected a Member of the Braintree Local Board and Urban Sanitary Authority, *vice* Portway, deceased.

WALKER, Mr. Melville Mitchell, has been appointed Treasurer to the Hunslet Guardians and Rural Sanitary Authority, Yorkshire, *vice* Gatecliff, resigned.

WALTON, Mr. John, has been appointed Chief Inspector of Nuisances for the Oldham Urban Sanitary District, at £120 per annum, with uniform, *vice* Drew, resigned.

WHITEHURST, Mr. Superintendent, of the county constabulary, has been appointed inspector of lodging houses at West Bromwich at a remuneration of £20 per annum.

WILSON, Mr. Alderman, has been re-elected Chairman of the Tyne Port Sanitary Authority for the ensuing year.

VACANCIES.

MEDICAL OFFICER OF HEALTH for the Arlecdon and Frizington Urban Sanitary District, Cumberland.

MEDICAL OFFICER OF HEALTH for the Egremont Urban Sanitary District.

MEDICAL OFFICER of HEALTH for the Usk Urban Sanitary District, Monmouthshire.

MEDICAL OFFICER OF HEALTH for the Whitehaven Rural Sanitary District.

TREASURER to the Prescot Guardians and Rural Sanitary Authority, Lancashire.

CLERK to the Milverton Local Board and Urban Sanitary Authority, Warwickshire.

SURVEYOR OF HIGHWAYS AND INSPECTOR OF NUISANCES, and an Assistant ditto, to the Chelmsford Rural Sanitary Authority, at £250 and £200 per annum respectively, both from year to year, from March 25. Application, January 25, to W. W. Duffield, Clerk.

SURVEYOR to the Felling Local Board and Urban Sanitary Authority, co. Durham; £150 per annum. Application, 29th inst., to George Bolam, Clerk, Felling, Newcastle-on-Tyne.

SURVEYOR AND INSPECTOR OF NUISANCES to the Litherland Local Board and Urban Sanitary Authority, Lancashire: £100 per annum, with house. Application, 21st inst., to Thomas Goffey, Law Clerk, 15 Lord Street, Liverpool.

CHIEF INSPECTOR OF NUISANCES for the Oldham Urban Sanitary District, at £120 per annum, with uniform. Application, January 21, to Hesketh Booth, Town Clerk.

INSPECTOR OF NUISANCES for the Uckfield Rural Sanitary District, Sussex, at £75 per annum. Application, January 23, to H. Jones, Clerk to the Authority, Lewes.

COLLECTOR to the Ashford Local Board and Urban Sanitary Authority, Kent.

LOCAL INTELLIGENCE.

CLAINES LOCAL BOARD DISTRICT.—It is proposed to amalgamate this district with the City of Worcester; and Mr. Thomas Roberts, the Clerk, has been appointed to take the votes of the owners and ratepayers, for or against. Voting papers are to be issued on the 17th and 18th inst., collected on the 22nd, and examined and counted on the 23rd.

Mr. Edwin Tucker, the late chairman of the Abergavenny Board of Improvement Commissioners and Urban Sanitary Authority, has been presented with a massive silver dessert service, at a public dinner, at which Mr. Bishop, the present chairman of the Board, presided. The centre piece bears the following inscription:—'Presented by the inhabitants of Abergavenny and neighbourhood to Mr. Edwin Tucker, on his retirement from the Board of Commissioners, in grateful recognition of his services as one of the representatives of the town for a quarter of a century, and as chairman of the Board for the last five years. November 30, 1883.'

The Mansfield Improvement Commissioners and Urban Sanitary Authority have increased the salary of Mr. E. G. Goodacre, the Inspector of Nuisances, from £80 to £130 per annum.

The Guildford Rural Sanitary Authority have, by an order of the Local Government Board, been invested with urban powers for lighting the contributory places of Farncombe, Charterhouse, and Crownpitts.

Mr. Arden Hardwicke, C.E., surveyor and engineer to the Corporation and Urban Sanitary Authority of Longton, having been appointed to a similar office by the Corporation and Urban Sanitary Authority of Walsall, has been entertained at a complimentary dinner at the Union Hotel, Longton, Alderman J. G. Bakewell in the chair, Mr. G. H. Hawley in the vice-chair, and presented with a purse of gold and a gold necklet for his wife, and the following illuminated address:—'On behalf of your numerous friends, I offer the accompanying purse of gold for your acceptance, and a gold necklet for Mrs. Hardwicke as a mark of the friendship and regard in which you were held during the eight years you were with us as borough surveyor and engineer, and we offer both of you our warmest wishes for your prosperity and success.'

The West Bromwich Town Council, at their monthly meeting on the 2nd inst., resolved, by a majority of two, to increase the salary of Mr. W. A. Davies, assistant-surveyor, from £100 to £130 per annum. Considerable opposition was manifested to the increase, which was only carried by the sufficient majority, in consideration of the fact that important sewerage works are in progress, which are being carried out under the supervision of the borough surveyor, and with which Mr. Davies has had a great deal to do.

The Lancaster Guardians and Rural Sanitary Authority have increased the salary of Mr. J. Ennion, their clerk, by £70 per annum.

The Lancaster Town Council and Urban Sanitary Authority have increased the salary of Mr. Alfred Creer, the surveyor, to £350 per annum.

NOTES AND QUERIES.

Having for some time back been in the receipt of Queries appertaining strictly to sanitary work, and which it would be easy to answer, without having to refer our correspondent to competent professional advisers, we have opened a column in which to register such Queries and Replies thereto as can fairly be expected from us; and our subscribers and readers are invited to make such use of this column as will tend to benefit themselves and the community. Both Queries and Replies will, however, be subjected, if unnecessarily long, to a strict curtailment.

113. THE DISPOSAL OF CARCASES.

Many thanks for your answer to my query 112 in last month's number. I am afraid I did not make my question plain enough. In your answer you say I am to get a general order from the Guardians in future to act in their name. My complaint happened on the evening after the Board met, and they only meet once a fortnight, and for a summons the magistrates only meet twice a month. Now what I want to know is, in the absence of any order from the Board (which would be difficult to get in my case), am I justified in having the animals buried upon the land where I find them, that is private land? or would a magistrate give me an order to bury the animals?

AN INSPECTOR.

(You have no power to remove or dispose of any carcase or other animal matter merely because it is a nuisance likely to be injurious to the health of the neighbourhood; the only remedy in such cases is to get your Board, or the clerk, to take out a summons against the occupier of the premises where the nuisance is. If you think the carcase is intended for human food, you may, without any summons or warrant, seize it, and take it before any magistrate, who, if he thinks it to be unfit for human food must condemn it, and order it to be destroyed. Neither you nor he can bury it in private land without the consent of the owner of that land.—ED.)

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ORIGINAL PAPERS.

HOW CAN THE PRESENT INSANITARY HOUSING OF THE POOR BE REMEDIED? *

By HERBERT PAGE, M.D., S.Sc.C.Cantab.

IT must be a matter of sincere gratification to all earnest sanitarians, especially to those who, like ourselves, are daily brought into contact with the subject in all its important bearings, that the public conscience has at last been recently awakened and forced to recognise that the insanitary conditions of the dwellings of the poor, at least as found in our large centres of population, are both a national disgrace and a social danger. Such being the case I have chosen 'How can the Present Insanitary Housing of the Poor be Remedied?' as the subject of this paper, for these reasons: it is of special interest just now both to ourselves as sanitarians, and to the general public; having watched the discussion of the subject in the various phases in which it has recently appeared in professional literature, in the magazines, and in the daily press, one or two points suggested to my mind by practical acquaintance with the subject, which seem worthy of notice, do not appear to have been alluded to elsewhere, and lastly, by throwing the title of my paper into the interrogative form (although the full discussion of the subject is beyond the limits of a single paper or meeting), I wish to elicit such further discussion and opinions as your valuable and varied experiences may suggest, and so perchance add a fresh contribution not unworthy of consideration to the satisfactory solution of the problem. One of the earliest, if not the earliest, publication to startle the public apathy on the subject was the pamphlet entitled 'The Bitter Cry of Outcast London,' followed by all kinds of writers and speakers, from Cabinet Ministers, members of Parliament, &c., downwards, who have treated the subject from the standpoints of the philanthropist, the statesman, the capitalist, &c., not forgetting the excellent contributions by *Punch*. None of these afford us greater gratification than the action of the President of the Local Government Board, who has shown himself superior to his predecessors, as by personal visits to some of the worst areas in London and Birmingham, he has made himself practically acquainted with the facts of the case. Justly proud as the public press may be of having awakened the public negligence and contributed largely to bring the subject within the range of practical legislation, the fact seems to me to have been overlooked, or at least not duly noted, that ever since the Public Health Act (in some cases long before) required official annual reports from all medical officers of health, besides an enormous amount of other information on sanitation in all its bearings, hundreds of these reports have accumulated in London, containing careful, exact, descriptive, and technical reports on the state of the dwellings of the poor and artisans as existing throughout the country, from the pens of able and zealous medical officers of health who have boldly spoken and carried out their duties in this respect. These witnesses to the earliest recognition of the subject and calls to the attention it demanded, are stored away, and are alike inaccessible to those who, like ourselves, are specially interested therein, and to the general public. So that through this great fault in our sanitary organisation, the earliest workers in the subject have been overlooked or at least tardily recognised. The problem, as the President of the Board of Trade truly recognised, is a complex one. 'The wretched condition of the dwellings of the poor,' he says, 'are only one incident in the general condition of a large part of the population; poverty, ignorance, and crime are other factors,' and consequently independent and manifold must the remedies be; these must embrace more stringent application of existing sanitary legislation; supplemented, as I think will be found necessary, by further legislation, at least temporarily, seconded by philanthropic and Christian efforts, but chiefly will the remedy be improved general and sanitary education. The remedy is beyond private enterprise, unaided philanthropy, emigration, or even State aid alone, as some would have us believe. Having carefully studied the utterances of Lord Salisbury, Lord Claud Hamilton, the President of the Board of Trade, the President of the Local Government Board, Messrs. Mundella, Fawcett, G. W. Hastings, and others, including Mr. Ernest Hart, both in his utterances on the platform and in the columns of the *British Medical Journal*, I would summarise my views thus. Fresh legislation has on some hands been decried and looked upon as 'thoughtless clamour,' 'the favourite specific of the shallower reformers who have not time or patience to examine whether an adequate and sustained exercise of powers that already exist might not much better achieve the object desired;' but existing legislation *has* already proved itself inefficient, inasmuch as it has allowed the present condition of things to continue and increase. Most of the chief sanitary enactments contain intrinsic flaws, forming playgrounds for almost endless and expensive legal tournaments, but of vital sanitary consequence. In the first place it must be recognised that all kinds and degrees of insanitary conditions of dwellings exist in the small towns and country as well as in the cities and large centres of population, yet in the former, owing to the influence of vested interests in the sanitary authorities, and the absence of any organised extra local sanitary supervision of the authority, the medical officer of health, or the inspector (both fettered by the same interests), much remains untouched or inefficiently dealt with, notwithstanding the existing powers under the Public Health Act and other sanitary enactments. Special legislation is wanted to deal efficiently with existing dilapidated property. Building by-laws should be extended to the entire country, not the urban districts only, with some reasonable and expeditious means of enforcing penalties on the local authority for omissions of statutory sanitary duties. Why should not an aggrieved ratepayer be able to recover half the statutory penalty from the sanitary authority for grave statutory sanitary omissions on his premises? but in the 'aggrieved ratepayer' let a repetition of the legal farce of the 'prejudice of the purchaser' of the Adulteration of Foods and Drugs Act be avoided. Again, legislation is requisite to remedy the cumbrous method of setting in operation such Acts as the Artisans' Dwellings Act, 1868, the onus of movement being thrown on the medical officer, or, worse still, on four or more aggrieved householders of the rotten property; and it is required to abolish the

* Read before the Birmingham and Midland Association of Medical Officers of Health, January 3, 1884. (See SANITARY RECORD of January 15, p. 361.)

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absurdity, under the Artisans' and Labourers' Dwellings Improvement Act, 1875, of the rates having to pay fancy and prospective values for death-dealing properties and areas. The principle of enforced remedy by the sanitary authority upon the owners, with option of purchase by the authority at a fair price, should be extended to all urban sanitary districts. Again, the by-laws as to houses let in lodgings, of the Public Health Act, should be universally in force and compulsory, and should include all tenement houses. Or, if Sir Charles Dilke intends, as he announced he did at Birmingham, to utilise the provisions of the old Sanitary Act, 1866, its application should be made universal and compulsory. Viewing as a whole the insanitary condition of the dwellings of the poor throughout the country, and the weak and fatal points in all existing sanitary legislation, its permissive character and absence of supervision, short and efficient legislation might be achieved by enacting the principles of the bold and just scheme ably sketched under seven headings by the hon. member for this borough, the President of the Board of Trade. Such an Act would make short work of existing legislative difficulties surrounding the problem, and under the directorship of the author of the Bankruptcy Bill, seconded by the energetic President of the Local Government Board, it would achieve as signal sanitary success as the last-named measure is probably destined to accomplish in commerce. Volumes exist on the legal 'rights' of property which are rigorously enforced, but we want a few legal compilations on the 'duties' of property, with a workable scale of penalties and mode of their recovery for omissions of the same. A dwelling on being let ought to be statutorily assumed to be in good sanitary condition, healthy, and not to contain any disease or death-dealing contrivances. Sanitary authorities should be compelled in any future house legislation, to keep a register of the plans and exact sanitary conditions of all dwellings within their district, available for inspection to any intending resident; no building should be allowed to change hands or be re-let unless inspected and certified by the sanitary authority to be sanitarily satisfactory under certain statutory heads; for this a small fee or scale of fees might be chargeable, and the applicant should be able to readily enforce statutory penalties on the sanitary authority on proof of statutory sanitary defects or omissions. In the case of tenement houses or those frequently changing residents, quarterly inspection and certification should be required. As under whatever steps, legislative or otherwise, are taken, legal battles are sure to arise, it is worthy of consideration whether when once a legal decision has been given on any point, it should be codified by the central sanitary authority, communicated officially to all sanitary authorities, and appeal to such should be held conclusive, and stop any further litigation on the same question in any other place in all courts of law. Although undoubtedly fresh legislation on the subject of insanitary dwellings should not be spasmodic, inefficient, or permissive, but 'proceed with caution,' as Lord Salisbury put it; it must be stringent, effective, universal, and, in a sense, undoubtedly confiscatory: since a fair deduction even upon the property's intrinsic value ought in justice to be made, on account of the cost already entailed on the community by preventable sickness, disease, and death caused thereby. In conclusion, one point remains to be noticed, seeing that whatever legislative course is adopted the sanitary inspectors, particularly the medical officers of health, will necessarily play a very important part in the matter; and as their powers, qualifications, tenure of office, and position are under the present sanitary organisation very unfair and anomalous, it becomes a question whether it would not be wiser, whilst striking at the root of the insanitary dwellings evil, to go also to the root of the failure of the existing sanitary organisation, and in one non-piecemeal act of legislation (including the principles of Mr. Chamberlain's recommendations) give us a comprehensive, workable Public Health Act. It is gratifying to notice that the necessity of an improved official 'status of sanitary officers' in connection with this question is recognised outside the profession. Lord Claud Hamilton alluded to it, recommending that 'their salary be increased,' but he only partially comprehends or expresses the difficulty, for he adds, 'and that they should be *recommended* (!) not to take private practice.' In the cities and combined districts they are required, and, indeed, their duties demand that they be sufficiently salaried and debarred from private practice, but in the small town districts the contrary holds, and, being under the adverse influence before alluded to, they are, at least the medical officers of health, allowed to practise. These small towns and districts ought either to be compelled to pay an adequate salary for the work statutorily required (which could hardly be expected, nor is it to be desired), or, what would be far better and more economical, they should be merged into a convenient combined area. With respect to interference with 'freedom of contract' and fair rents, so that those of the new sanitary buildings required to be erected by the owners or authority, upon or near the site of the demolished rookeries should not be extortionate, a right of appeal might be created to fix a 'fair rent,' as in the case of recent Irish legislation.

The scope and lines for such a reorganisation of the sanitary system of the country are not far to seek: they are admirably laid down in the suggested Public Health Act of Dr. Bond (Gloucester), and in the 'Report of the Joint Committee on State Medicine of the British Medical Association and Social Science Association, 1877,' provisions too well known to need enumeration before such an Association as this. By means of these the present problem would be solved in its sanitary bearings, sanitation advanced; its efficiency would be speedily proved by diminished sickness, disease, and mortality; with the accomplishment of a much larger amount of work, with smaller staff and less expenditure, than under the anomalous, inefficient, and costly organisation now in operation.

Summary of the Proposals of the President of the Board of Trade.

1. Law to punish owner of property kept unfit for human habitation.
2. Local authority to acquire property, arbitrator to deduct a sum for damage done thereby to public health.
3. Local authority to have power to close or improve property at owner's expense without being compelled to purchase it.
4. Fair price only to be given for property, no fancy or prospective value.
5. No appeal from value assigned to property by official arbitrator.

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6. Part of cost to be levied on adjacent property, the value of which is increased by the improvement.

7. Cost of reconstruction of unhealthy area to be levied on *all* owners of property in the proscribed district.

INFANT MORTALITY.*

By F. E. ATKINSON, L.R.C.P.Lond., M.R.C.S.

Medical Officer of Health of the Craven Combined District.

THE Registrar-General's Returns offer us many humiliating statistics, but none are so sad as those which detail the mortality among infants and young children.

The duty of the medical officer of health is to wage war against preventable disease and death, and while it is his special duty to check the propagation and spread of zymotic diseases, these are surely less tangible, less under control, and therefore less preventable than the physiological starvation, the overfeeding, the exposure and neglect, which cause the death of thousands of children annually.

Apart from the measures taken by sanitary authorities and their officers for the reduction of the general death-rate, such as the provision of wholesome water supplies, proper systems of sewerage, and means of ventilation, all of which will have their beneficial effect upon infant life, there are certain special preventive measures which are requisite only in the case of children before the infant mortality rate and death-rates among young children can be reduced to their normal limits.

By infant mortality is generally meant the deaths of children under one year of age, but if we take into consideration the total deaths under five years we then have a much more comprehensive period to deal with, and shall arrive at a more just appreciation of the causes of death, inasmuch as the first five years of life contain the critical periods of weaning and primary dentition.

In all the returns which we make to head-quarters in London we have to classify the deaths and cases of sickness under two heads, viz., of persons under five years and over five years.

According to the late Dr. William Farr, our greatest authority upon vital statistics, the mean annual death-rate per 1,000 children under one year is 182·6.

It is well known that the rates of mortality among children vary considerably with the locality and surroundings in which they are placed. Thus, Dr. Farr has also shown us (in the Supplement to the Thirty-Fifth Registrar-General's Report) that out of 1,000,000 children born alive in England, 263,182 die under five years of age; that even in the healthy districts of the country 175,410 out of the million die in the first five years of life, while in the Liverpool district, which serves to represent the most unfavourable sanitary conditions, out of the same number born, 460,370, or nearly one-half, die within the five years following their birth. This is 284,960 in excess of the deaths in the healthy districts.

This excess has been shown to be largely due to density of population, overcrowding, and the consequent filth in the air and soil around the dwellings.

To come down to the smaller figures and areas, the rate of infant mortality—that is, of the deaths under one year—in Yorkshire during last year was 157 per 1,000 births, that of the West Riding 156 per 1,000, and in the principal towns the rates were as follows per 1,000 births:—Leeds, 180; Sheffield, 165; Bradford, 177; Hull, 166; Huddersfield, 182; Halifax, 168; and York, 188. In London during the same period it was only 151 per 1,000, whereas, during the third quarter of the year it reached as high as 317 in Leicester.

It is a well-known and almost invariable fact that the largest proportion of infant deaths occur in the third or summer quarter of the year, and these are largely attributable to diarrhœa, occurring within the first year of life, and frequently within the first few weeks.

In my own combined district, which is of a rural nature, the infant mortality rate for the whole district was 124 per 1,000 last year, while in individual urban districts it has reached a much higher figure—viz., 200 in the Haworth Urban District in 1881, and 150 in the Silsden Urban District in 1880.

The deaths of children under five years, on the other hand, have in one instance in 1880 reached 42·1 per cent. of the total deaths in the Skipton Urban District, and 40·6 per cent. of the total deaths in the Haworth Urban District in 1881.

I will consider a few of the chief causes of death among young children. Although under the present nomenclature of disease the causes assigned are frequently very vague and unsatisfactory—many of the terms used indicating symptoms rather than diseases—I think we may fairly classify the actual causes of death among young children under four principal heads.

1. *Hereditary Diseases*, including cases of tubercular disease in its different forms, recorded under the names of phthisis, meningitis, tabes mesenterica; scrofula, rickets, hydrocephalus, and syphilis.

2. *The Acute Infectious Fevers:* zymotic diarrhœa, measles, whooping-cough, scarlatina, diphtheria, small-pox, and fever.

3. *Inflammations of the Respiratory Organs*, registered chiefly under the headings of bronchitis and pneumonia.

4. *The Diarrhœal or Wasting Diseases*, including cases registered as marasmus, atrophy, debility, inanition, want of breast-milk, convulsions, teething, and diarrhœa.

The largest number of victims of this first class of diseases are to be found in large towns, where all the conditions of life conduce to their development, and where the value in the manufactures of skilled workmanship, apart from physical strength, give to the constitutionally diseased and physically weakened individuals the opportunity of marrying and of bringing into the world children who would be but weakly under the most favourable circumstances; but who, being born as they are under the most adverse influences, find but a brief and painful existence. Some of these diseases have not the time to develop, as the child, from its constitutional weakness, succumbs early to one of the diseases enumerated among the other classes.

Now that the communicability of phthisis is clearly established we are able to realise more fully the danger of association of the diseased with the healthy in workshops and crowded dwellings, but especially in the marriage relationship, entailing, as it does, not only danger to the possible offspring but probable disease to the healthy partner. The

* Read at a meeting of the Yorkshire Association of Medical Officers of Health, Keighley, Nov. 1883.

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importance of choosing nurses free from any phthisical taint cannot be too strongly urged.

I now come to the second class—viz., the infectious fevers, diarrhœa, whooping-cough, measles, scarlatina, diphtheria, small-pox, and fever.

The zymotic diseases of early childhood are chiefly confined to the first four named. According to Dr. Farr, diarrhœa and whooping-cough are the most fatal in the first year of life, measles in the second, and scarlatina in the third, fourth, and fifth. Out of every million children born in England, 20,000 die from diarrhœa and dysentery before they reach five years of age, while in the unhealthy and populous districts, of which the Liverpool district is taken as the type, this proportion is increased to nearly 52,000. Over 17,000 deaths of these million children are attributed to scarlatina, this proportion being increased in the unhealthy districts to over 26,000. 14,000 deaths are due to whooping-cough, increased to 32,000 in the unhealthy districts; 11,000 from measles, increased to 25,000 in the unhealthy districts. While, from all the zymotic diseases together, 87,000, increased to 171,000 deaths in the unhealthy districts, take place out of every million children born alive, before they reach the age of five years.

This class of diseases is specially fatal in infancy and childhood, owing to the greater susceptibility of children to the infection, and their smaller powers of resisting and recovering from the disease, and perhaps we may add, their greater liability to contract it, arising out of their dependence, as an article of diet, upon what is known to be one of the principal channels for conveying the poisons of zymotic diseases—I mean, of course, milk. It has been frequently remarked that milk is the most suitable pabulum for the nourishment of organic germs; that it very readily decomposes when exposed to the emanations of putrefying organic matter; and that almost every known form of bacterium has been found in it.

We are accustomed to recognise three principal means by which the poisons of zymotic diseases are conveyed in milk:—

1. By contamination from the surrounding air—example, diarrhœa. 2. By direct contamination from persons suffering from the disease—example, scarlatina. 3. By indirect contamination from persons suffering from the disease by the washing of the milk-cans in polluted water—example, typhoid fever. The first of these sources is most likely to occur after delivery, and the second and third before the delivery of the milk to the householder.

Hence the desirability of keeping this, which is so essentially the food of children, in covered vessels, and far removed from every possible contamination, and where there is the slightest risk, the boiling of the milk before use, as a precautionary measure. The prevention of the two latter sources is only to be found in the transfer by the Legislature of the control and inspection of dairies, cowsheds, and milk-shops from the officers of police to the officers of sanitary authorities.

It is to my mind a matter of regret that all deaths returned under the head of diarrhœa should be classed under the head of zymotic diseases, whereas, a vast proportion of the deaths returned from this cause are not due to specific poison, but are only symptoms of some or other wasting disease, the result of mal-nutrition, due to improper feeding and consequent intestinal irritation, in the case of children; and, in the case of adults, frequently secondary to some chronic disease, such as the terminal diarrhœa of phthisis. On the other hand, the summer diarrhœa, or cholera infantum, so prevalent in the third quarter of the year among infants and adults alike, but chiefly fatal among infants, should be considered as quite distinct, and as due to a specific poison.

Nowhere is this more apparent than in Leicester, which town has a higher zymotic rate from summer diarrhœa than any other place in the country, and where, as has been shown by Dr. Johnston in his excellent report on the prevalence of summer diarrhœa in that town in 1878, that, of the 238 deaths among children under one year of age which occurred during the third quarter of the year, 76·5 per cent. were healthy at the time of birth, and no fewer than 165, or 69·3 per cent. were entirely breast-fed.

The diarrhœa in these cases was distinctly not the result of mal-nutrition.

Dr. Johnston ascribes the disease to the fermentation which occurs where sewers of deposit exist, when the temperature rises above 57° F., giving rise to the development of bacteria in quantity corresponding to the degree of temperature attained. These bacteria, he found, could easily pass through the water in ordinary traps, the evaporation of which in hot weather polluted the air, which found its way into the dwelling-houses, and contaminated any food which was there exposed, *e.g.* milk, meat, butter, fruit, &c. It is to be inferred that, in the cases of the breast-fed infants, the poison was inhaled by the lungs.

There is no doubt that a large amount of zymotic disease among children is due to the fatalistic belief so prevalent even among the better-educated classes, that scarlet fever, measles, and whooping-cough are just as necessary evils in a child's development as dentition, and which leads them not only to neglect precautions but to cultivate these diseases when they appear among them in a mild and simple type.

Here again we have to look to the Legislature for the only true remedy against the propagation and spread of infectious diseases in a general Act applying to the whole country, which should provide for compulsory notification of all cases to the sanitary authorities, their compulsory provision of hospital accommodation for the isolation of such cases when necessary, and powers for the compulsory removal of the same.

This class, usually spoken of as the 'preventable diseases,' is to my mind much less preventable than those which are to follow, inasmuch as the exact origin and working of these poisons is still to us to a great extent a matter of speculation and theory, although we are more conversant with the various channels through which each is spread. The precautions, therefore, given to the ignorant and uninitiated must be accepted by them merely in faith, and are not on the same footing as instructions as to the hygienic clothing and feeding of children, which are more readily explained, and appeal more or less to the common sense of every individual.

The next class for our consideration is the diseases of the respiratory organs, chiefly bronchitis and pneumonia. Of these 41,000, increased in the unhealthy districts to close upon 80,000, die out of 1,000,000 children born alive, before they reach five years of age.

Of course a few of the deaths registered under these headings are due to secondary lung-mischief

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during the progress of other diseases, or are the sequelæ of one or other of the infectious fevers, but the vast majority are without doubt due to exposure owing to the improper and insufficient clothing of the young in this variable climate of ours. All classes are to blame in this matter, which is mainly attributable to poverty, ignorance, and vanity, the two former among the lower classes, and the two latter among the upper classes af society.

It is well known that the very young and the very old are much the most susceptible to the influence of cold and sudden changes of temperature, but this knowledge is unfortunately rarely acted upon or even thought of; and while adults are clothed all over, little children are allowed to crawl about in and out of doors, even in the depth of the severest winter, with nothing on their arms, legs, and necks, frequently with nothing below the hips, only about one-third of the surface of the body being clothed, and perhaps even that insufficiently.

Among the upper classes this is generally the result of vanity on the part of the mothers, who like to exhibit the pretty limbs and necks of their children, quite regardless of their present and future health and development.

The child who, for the first few weeks of its existence, is perhaps too heavily and warmly clothed, has its lower extremities suddenly bared just when it begins to crawl about the floor, and when therefore its body is constantly exposed to draughts, driving the blood from the surface to the interior, and producing congestion of the internal organs.

This treatment is, I believe, one of the chief causes of those sudden attacks of croup, bronchitis, and associate evils which carry off so many young children. To this also we may trace the development of hip-disease and rheumatism.

When children do not succumb to the more rapidly-fatal congestion of the lungs, digestive and intestinal derangements are set up which interfere with proper nutrition, and from the results of which they suffer all through life. I am quite sure that could mothers be persuaded to provide their little children with knitted woollen garments, which are warm, light, and porous, and which should cover the entire surface of the body and limbs, they would banish much disease and death from their families. Undue coddling is to be avoided on the one hand, and the foolish practice of hardening children on the other; but with the adoption of light woollen clothing, and that evenly applied, the natural freedom of the limbs is not curtailed, and the surface maintains that even warmth which is essential to the nutrition, development, and healthy functions of the different organs.

The ignorance of the laws of health, and the false modesty which refuses to know the elements of physiology, which exists among all classes, are at the root of much of this, and the remedy lies entirely in the proper education of the public, particularly of the female portion of the population, as in the hands of the woman rests to so great an extent the health of her house.

The science of hygiene should form an important element in the curriculum of all schools, both national, private, and public, throughout the country.

I now come to the last and most important class of diseases, viz., those wasting diseases which find their origin in mal-nutrition, due to the insufficient, improper, or over-feeding of young children.

The names under which the deaths from this great cause appear in the Registrar's Returns are legion. I need not enumerate them. The only proper and sufficient food for infants is naturally their mother's milk. Too often this is withheld by fashionable mothers because of the trouble and sacrifice of pleasure entailed; by the poor one by her absence from the child in her efforts to add to the family income. I believe there are very few cases where a woman could not suckle her child if she would.

To those who can, but will not, must be laid a vast amount of preventable suffering and death. We may look for a large decrease in infant mortality when it becomes fashionable for the rich mother to nurse her child, and when the Legislature shall interfere to prevent the working at the mills of women for at least two months previous to, and seven months after, their confinement.

It is a well-known fact that during the Lancashire famine, when there was no work to be had, the infant mortality rate fell considerably, in spite of the decreased earnings.

This has also been the case at Coventry, where the diarrhœal death-rate among children, due to improper feeding, has been shown to vary considerably and in proportion to the prosperity of the trade, being reduced by two-thirds when the trade was at the slackest, and the mothers consequently thrown out of work.

In those cases where breast-feeding is impossible I believe the best substitute is the artificially prepared human milk according to Dr. Frankland's recipe, which is practically the same in chemical composition. This is both easily and cheaply prepared merely by depriving cow's milk of one-third of its casein by means of rennet (fresh calf's rennet should be used, and not the essence) and adding sugar of milk.

The only expense is in the sugar of milk, which, of course, costs more than ordinary sugar; the calf's rennet lasts for an indefinite time. There is a great tendency to add solid foods to milk, under the impression that milk alone is not sufficiently nutritive. To most minds it is an incomprehensible fact that a pint of milk contains as much solid nutriment as a good-sized mutton chop. The next point calling for attention is the use of starchy foods, as arrow-root, corn-flour, and many of the patent foods. These are frequently resorted to in the early months of infancy, before even dentition gives rise to the flow of saliva necessary for the reduction of the starch to an assimilable form, and still more frequently at a later period, before the function of the pancreas is fully developed. Such foods in an unassimilable form act only as foreign bodies and irritants in the digestive tract, and physiologically starve the child.

Among hand-fed children the want of absolute cleanliness in the preparation of their food, and of the vessels used; the use of food which has begun to ferment; the giving of meat to children before they have any teeth for mastication, or even later on, when they have only the 'milk teeth' (so called because they are only suitable for the mastication of farinaceous and vegetable foods, which to the ignorant mind appear to require none at all); the overfeeding of some children, allowing no interval of rest to the digestive organs, but giving food at all times between meals, and whenever they cry; but, worse than all, the habit, found chiefly but not entirely among the poorer classes, of giving to infants

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portions of 'anything that's going' from their own food, both of solids and liquids—all point to the deplorable ignorance which exists amongst all classes as to the rules of health and the laws of physiology, a knowledge of which is so essential to the life of the community.

I have seen a lady enter the refreshment room at a railway station, and ask for a glass of hot gin and water for a baby in arms which was crying and evidently in pain. The mixture was prepared as for an adult, and some of it administered, of course without the desired effect. The child of a working man was being attended for some digestive derangement, and the mother was instructed to be very careful about the child's diet, giving it nothing solid. She promised to comply. On his next visit, the medical man was told by the mother that she had obeyed his instructions, but that the child was no better. Noticing that the child appeared to have something in its mouth, he put in his finger and extracted a piece of pork, part of the family meal then on the table. The medical attendant informed her that in the event of the case terminating fatally he should decline to give a certificate. Were his example more often imitated, mothers might be frightened into taking more care as to the diet of their children.

Great facilities are offered to parents and guardians to get rid of children by the fact of there being so little difficulty in getting a Registrar's certificate in the case of uncertified deaths, of which latter there are sadly too many. There is no doubt that a coroner's inquest should be compulsory where no medical man has certified as to the cause of death.

I was glad to see recently that a Lancashire coroner had declared his intention of bringing in as 'manslaughter' all cases brought before him of the deaths of children when the cause could be proved to be culpable neglect in the matter of diet. I am afraid that the insurance policies upon the lives of children, which are so easily effected, are too often the insurance of their early death; and that the money advantage accruing therefrom makes the parents regard the decease of their offspring with not altogether unmitigated woe.

For the well-being of a child, nothing is more absolutely necessary than that it should not be left to the care of incompetent persons. This is done not only by the poor woman who, while out at work, leaves her infant to the care of children of often but little larger growth, but by the rich mother, who surrenders the government of her nursery to her servants, who are too often ignorant alike of the laws of health and of moral training. The poor woman has some excuse, the rich one none. To the rich we would say—'Your duty is with your child;' to the poor, 'If you must leave it, leave it in good hands.'

I would that everywhere safe hands were provided in the competent nurses of a crèche. In large factories, where many married females are employed, a day-nursery on or near the premises might be provided. The mothers could then nurse their children with but little loss of time; and in that case, they might return to their work as soon after confinement as their strength would permit.

Private enthusiasm might do much in the establishment of such day-nurseries everywhere, but doubtless the most satisfactory results would be obtained by a general crèche system under Government, such as they have in Belgium, where its value is shown in a lower rate of infant mortality than that of any country in Europe. For information on this subject I would refer you to an excellent paper by Dr. McCook Weir, published in the SANITARY RECORD for July 1879.

In conclusion, the measures necessary to prevent this enormous waste of infant life are :—1st, Legislative, and 2nd, Educational.

The proposed laws for its prevention are visionary, and doubtless would be considered by many as exorbitant, and as infringing too much upon the personal liberty of the subject, no matter how beneficial to the individual and to the public generally these measures might prove.

But in educating the people we cannot err; and although the matters to which I have referred in this paper may appear to some of you not to fall within the official duties of the medical officer of health, yet, inasmuch as he should be in his district the enthusiastic instigator and supporter of all measures for the promotion of its health, it behoves him to stir up such enthusiasm and private effort as shall lead to the organisation of health societies and all kindred institutions calculated to promote the well-being of society, and to guard with the utmost care its source—the cradle.

ARTISANS' DWELLINGS IN THE CITY.

IF Sir Richard Cross could have foreseen, when he introduced the Artisans' and Labourers' Dwellings Act in 1875, that what with one delay and another, nearly nine years would elapse before practical steps were taken to rehouse the poor of the City of London whom his Act would displace, the enthusiasm with which he prosecuted that measure would have been somewhat damped. His successor in office had, it must be admitted, considerable justification for the strictures in which he indulged when the deputation from the Mansion House came on the 25th ult. to urge upon the Ministry a strengthening of the law as to the homes of the poor.* Sir William Harcourt, after speaking somewhat despairingly of the answers he had received from the vestries to his inquiries about their action under the Artisans' Dwellings Acts, confessed to a feeling of special disappointment at the state of affairs in the City, which, as he said truly enough, might have been expected to have given the lead to the rest of the local bodies in any action of this character. The fact that, only three days before the deputation came to Whitehall, the first stone of the first pile of buildings erected under the Acts had been laid by the chairman of the Commissioners of Sewers, gave special point and sting to the Home Secretary's observations on the delays that had taken place. The City magnates, restive at any criticism of their doings, and perhaps nettled at the ingenious manner in which their inaction was turned into a plea for the new Municipality which it is the ambition of the Home Secretary to create, have rushed precipitately into print, first of all to deny that there has been any delay at all, and secondly, to deny that any delay that may have occurred is of their making. The average citizen, mentally bridging the interval between 1875 and 1884, may find it difficult to assent to the former proposition. The latter will command assent or dissent according to the platform from which it is regarded.

* *Times*, Jan. 26, 1884.

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It is beside the question now under discussion to speak, as the Lord Mayor has done in his letter of January 26,* of what the Court of Common Council did thirty years ago in the way of providing accommodation for the working classes out of some odd thousands of profits that could not decently be applied to anything else than social improvements. The practical question is—What has the City done, and how has the City done it, to utilise the powers given to it by the Act of 1875 of clearing away rookeries in its midst, and, what is of even more importance, of providing decent accommodation for the poor displaced? The Lord Mayor is able to point to several sites that have been cleared (with the natural result of still further overcrowding the areas in their vicinity); but he is unable to chronicle the causes of one single tenement for the housing of the poor whose dwellings have been for years swept away in the process of clearing. Into the causes of this the Lord Mayor does not go; but the Chairman of the Commissioners of Sewers has taken up the parable, and endeavours in a letter, dated January 29,† to acquit his board of any share in the delay. According to Mr. Shaw, the medical officer of health for the City was instructed, immediately after the passing of the Act at the end of June 1875, to report on the question; and it appears from other sources that on Oct. 19 of that year an official representation was made with regard to twenty-one areas, collectively about 440,000 square feet in extent. From one cause and another most of these areas have been either shelved, or disposed of in ways that need not here be detailed. But one of the areas—the Petticoat Square site—has got a stage further than the others; and as it is round this that the recent controversy has most strongly raged, it may be well to go into some detail with regard to it.

Dr. Sedgwick Saunders's representation as to this Petticoat Square site was made in October 1875, but it was not until 1877 that a local inquiry was held, and not until July 1877 that the Royal Assent was given to the scheme. Even up to this point there had thus been a good deal of delay, much of which must have been preventable. Some time after the Royal Assent, Sir Henry Hunt was appointed arbitrator to assess the claims of owners of property, and his final award was promulgated certainly before the end of 1878. As to the exact month there has been some little wrangle, but whatever be the precise date, it is unquestionable that since the completion of the purchase and clearing of the site in 1879, the ground has lain idle on the hands of the Commissioners. In January 1880, 'directly the ground was cleared,' according to Mr. Shaw, 'strenuous efforts were made by means of advertisements and otherwise to let it. But these efforts proved unsuccessful, as no persons were found willing to erect buildings as a private enterprise on the conditions approved by the Home Secretary.' Mr. Shaw omits to state, however, that offers were made to rent the land at a price which, however inadequate it may have appeared to the Commissioners would, nevertheless, have brought as good if not a better return than that which they have now achieved after four years' waiting and an amended Act of Parliament. Unwilling to accept the price offered to them, the Commissioners applied to the Home Office for permission to erect buildings on the site, and to utilise the ground and basement floors for commercial purposes. But this could not be done under existing Acts of Parliament, and it was not until the passing of the Act of 1882 that the Home Secretary found himself in a position legally to give his sanction to the proposals of the Commissioners. Those who are familiar with the working of administrative bodies and Government offices may possibly not be surprised at learning that it has taken eighteen months to elaborate plans, obtain contracts, and excavate foundations on a site already cleared; but to the average mind it certainly appears open to question whether greater foresight might not have been used in getting these matters as forward as possible, in anticipation of the amendment of the law. However, there can be no doubt now as to the activity of the Commissioners in pushing on the operations at Petticoat Square, and it only remains to consider how far they are advantaged by their four years' delay.

It has been said that early in 1880 the Commissioners attempted to let the property, but did not receive any offer that contented them. It was stated in evidence before the Select Committee on Artisans' Dwellings, in 1881, by Mr. E. E. Ashby, Mr. Shaw's predecessor as Chairman of the Commissioners of Sewers, that at least four offers had been made to the Board for the Petticoat Square site. One of these, from the Improved Industrial Dwellings Company, was of an amount that worked out at a fraction over 3*d.* per foot. There was also an offer 'which worked out about 4*d.*, and a second one at 4*d.*, with stipulations as to peppercorns and low rents for the first year or two.'*

The source of the higher offers referred to in Mr. Ashby's evidence does not appear in the blue-book; but for the purposes of our argument it will suffice to take the lower offer of the Industrial Dwellings Company, as coming from a body intimately acquainted with the working of this question and desirous of dealing with the particular site in a business spirit. In Sir James McGarel Hogg's return of last session (331), the area of the Petticoat Square site—including Meeting House Yard and Stoney Lane—is given as 81,055 feet, and all three were bracketed together as 'waiting the sanction of the Secretary of State to modification of improvement scheme, in conformity with the Act of 1882.'

Now, according to the statement of Mr. Shaw, made when the chief stone of the new building was laid on January 23,† the actual cost of the site, independently of professional fees, was 106,818*l.* Taking the site at roughly 80,000 square feet, and assuming that the offer made in 1880 by the Industrial Dwellings Company was at 3*d.* per foot only, this would have given an annual rental of something like 1,000*l.* for the whole area, or not quite 1 per cent. Having determined to erect tenements for themselves, the Commissioners have now accepted a contract for the necessary buildings at a price of 65,000*l.*, to which an additional 3,000*l.* has just been added, in order that the rooms may be 8½ feet high instead of 8 ft. They have also spent 2,490*l.* for sewers and gullies, making a total capital expenditure on the site of 177,808*l.* It is right, however, to add that this does not represent the whole of the cost of the property to the ratepayers; for in addition to the professional fees excluded by Mr. Shaw from his figures, a very large expense must have been

* *Times*, Jan. 28, 1884.
† *Standard*, Jan. 30, 1884.

* Minutes of Evidence taken before Select Committee on Artisan's and Labourers' Dwellings Improvement, 1881. Questions 3726 to 3730.
† *Times*, January 24, 1884.

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incurred for the advertisements which have been issued by the Commissioners with respect to the site. Mr. Ashby stated, indeed, in his evidence (Q 3725), that the Commissioners had advertised 'continuously,' so that a good round sum would have to be added to the figures before they could be regarded as complete. Assuming, however, that only about 178,000*l.* has been spent, we arrive at the following result:

The buildings to be erected will accommodate 937 persons, and will comprise 521 rooms; or 241 tenements of one, two, or three rooms respectively, and twenty shops. The price which the Commissioners intend to charge for these tenements has not been made public; but they will not be able to house the class of persons whom they displaced, and for whom shelter is required, if they charge much more than two shillings a week per room. The average price obtained per room by the three great agencies that have practically taken up the question of artisans' dwellings—the Metropolitan Association, the Improved Industrial Dwellings Company, and the Peabody Trustees—works out at something like 2*s.* 1½*d.* a room. Mr. Shaw has himself expressed, on behalf of the Commissioners, an anxious wish to provide dwellings really suited for the classes for whom they were intended, to the exclusion of the higher classes who now crowd the so-called artisans' dwellings; and (say) 2*s.* 3*d.* per week per room is quite as much as the poor to be housed can possibly afford for house rent. Counting each shop as equal to four single rooms, or as yielding ten shillings each per week, and assuming that the buildings will be always fully occupied, we get a possible gross income of about 3,500*l.*, made up as follows:—

600 rooms × 2*s.* 3*d.* × 52 weeks.

Allowance must however be made for the inevitable extras in the contract price, for bad debts, for tenements or shops unlet, and for other contingencies. It is found by experience that the cost of management, repairs, taxes, water, and the like of low-class property like this is not far short of 50 per cent., and, taking all things into consideration, the assumption that the net income will be equal to half the gross income, will probably prove an over-estimate. But even on this estimate the Commission will only get a net income of 1,750*l.* for an outlay of 178,000*l.*, or almost identically the same return as, at the lowest estimate, they might have had four years ago, with none of the troubles incident to being landlords of tenemented property. And for this barren return, if not actual loss, four precious years have been wasted, four years' rates have been lost to the parish, and what is infinitely more important from a sanitary point of view, the poor people displaced by the clearance have been driven to overcrowd still more the plague spots that have not yet been 'improved' after the fashion of Petticoat Square.

IN confirmation of the view that much of the excessive mortality of Newcastle has arisen from disease caught at school, we may note that at a recent monthly meeting of the City Council, Alderman Wilson, chairman of the Sanitary Committee, stated that on inspection some of the schools had been found to be in a most insanitary condition.

THE new waterworks at Ballykeel, near Holyrood, Belfast, have been opened. The reservoir is three acres in extent, and holds over two million gallons, and there are two filtering beds and a store reservoir. Mr. Macassey is the engineer, and Messrs. Ross and Sons carried out the contract for 6,400*l.*

ON THE WORKING OF THE PROVISIONAL ORDER FOR THE NOTIFICATION OF INFECTIOUS DISEASE IN MANCHESTER.*

By HENRY ASHBY, M.D., M.R.C.P.

Physician to the General Hospital for Sick Children, and Lecturer on Diseases of Children. The Owens College.

TWO years ago the Manchester Corporation acquired powers to obtain early information of the occurrence of certain infectious diseases within the limits of the city. The Act was entitled the 'Local Government Board's Provisional Order Confirmation Act, 1881 (44 & 45 Vict.).' The diseases included within the schedule consisted of small-pox, typhus, typhoid, relapsing, scarlet, and puerperal fevers and diphtheria, excluding measles and whooping-cough. Last year the authorities of Salford followed suit, so that at the present time the Act has the force of law within this district, and has been in operation sufficiently long to awaken much interest in its effects.

'Let sleeping dogs lie' is good advice, and possibly it may be unwise to stir the ashes of a still smouldering controversy, and yet this question contains so much of what affects the interests, the health, the lives of so many of our fellow citizens and ourselves that it cannot be otherwise than useful to discuss the influence for good or evil which it exercises on the community. It is a subject eminently fitted for discussion and ventilation by this society, inasmuch as it especially affects the interests of its individual members, interests which the society has been especially established to guard, and moreover, the members of this society are probably better able to give reliable information concerning its work than any other class of individuals in the community.

In the first place, let us consider its value to the community at large; and, secondly, its effects on the interests and rights of the individual. No one can reasonably doubt the great value it is to the health officer of a district to have the earliest intimation of the presence of so undesirable a visitor as cholera, typhus, or small-pox, or to be informed of the occurrence of typhoid or scarlet fever in an epidemic form. Without some form of compulsory notification the health authority remains in the dark, or only hears of the occurrence of epidemic disease through the courtesy of some medical man, through the gossip of the neighbours, or, more grimly, through the Registrar of Deaths. Moreover, the information may come too late to be of much service in tracing the origin of the outbreak or of stamping it out. Suppose that the real offender is a farmer miles away from town, who is distributing typhoid poison in his milk, the cases of typhoid arising therefrom occurring in the practice of different medical men, it can only be by information supplied by each that the central authority can deal effectually with the source of the evil, and limit as much as possible its baneful effects. Most of us must have seen instances of the most flagrant kind of the way in which zymotic diseases spread; seen, perhaps, the half-completed garments in a journeyman tailor's house utilised as bedclothes for a patient suffering from small-pox, or the 'wakes' and midnight orgies that take place at times in a fever-stricken house. A couple of years ago I saw in this city a woman, sitting behind the counter of a small

* Being an abstract of a paper read before the Manchester Medico-Ethical Association.

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shop, nursing a child sick with scarlet fever and at the same time serving out milk to customers; the child was 'isolated' in the shop, as the family took in lodgers, who declined its company in the back room. On another occasion I saw children desquamating from scarlet fever in the front room, and in the back room a woman confined twenty-four hours before, covered with a scarlatina rash and nursing her infant at the breast. In the absence of a regular notification of disease, such cases may never be brought before the notice of the health authorities; and I am perfectly sure that in Manchester at the present day all such cases would quickly be notified and at once sent into hospital, and much risk of infection avoided.

Has the operation of the provisional order in question diminished the amount of zymotic disease in Manchester? One result it has had certainly, and that is—that far more cases of zymotic disease, more especially scarlet fever and 'fever,' have been sent into hospital than in former years—a result not due to the presence of any epidemic—inasmuch as the mortality from these diseases has been markedly less. While the average number of deaths per annum in Manchester and Salford during the decade ending 1880 from scarlet fever was 518·5, in 1881 it was 205, and in 1882 it amounted to only 185. These latter numbers, however, will, I fear, be exceeded this year (1883). The average number of deaths from 'fever' during the past decade was 266; in 1881 it was 133, and in 1882 179. Let me be distinctly understood: I believe that most certainly the operation of the provisional order has been to diminish the spread of zymotic disease, because many more cases have been isolated in hospital which in former years would have been centres from which infection would have spread, but it would be premature to attribute the small death-rate from scarlet fever during the past two years to the operation of the Act. At least another decade must pass before it will be possible certainly to judge of its effects. The deaths from typhoid have unquestionably diminished during the last ten years, a result no one can doubt due to the abolition of the 'sixteen acres of cesspools four feet deep,' with their 'thousands of tons of contents' which formerly existed in Manchester and the substitution of ash-closets with the frequent removal of their contents. Will the notification of disease and removal of infected patients to hospital diminish the large annual mortality from scarlet fever? Yes, I reply, but we must wait some years, as we have had to wait in the case of typhoid, before we are in a position to prove it by statistics.

One of the disadvantages under which Manchester suffers is that it is hemmed in on several sides by districts with their own health authorities who are hardly likely to be entrusted with compulsory powers. In these districts infectious disease may abound and spread in various directions unknown to and uncontrolled by the health authorities. At the present time, for reasons chiefly connected with the rates, they decline incorporation with the city of Manchester, and thus they have their own health committee and medical officer who is engaged in general practice. I venture to express a very strong opinion that no compulsory powers of notifying infectious disease should be granted unless they employ medical officers of health who devote their whole time to the duties of their office.

Having now made a few remarks on the effects of compulsory notification and removal to hospital from a general point of view, we come to the debateable and difficult question of how the interests and rights of private individuals are affected by the Act. The medical practitioners of this district have tacitly acquiesced in the clause which compels notification by the medical man under a penalty of not exceeding 5*l*. No one likes compulsion, especially to what is often an unpleasant and disagreeable duty, but I believe, with small exception, the duty imposed by the Act has been loyally performed often at the risk of giving serious offence to patients. In many instances, especially among the neglected poor, where no isolation of any kind can be effected at home, and where their means do not allow of proper payment for a medical man's services, no difficulties have arisen as to the propriety in filling up the certificate and of receiving the half-crown fee for so doing. Few are likely to disagree with the propriety of removing to hospitals for six or seven weeks cases of children suffering from scarlet fever occurring among the courts and alleys of our city, where children and adults are huddled together at night, and the former, when the febrile stage is over and desquamation in progress, leave their beds to play in the streets or are sent off to school. Difficulties most often occur in those cases where infectious disease breaks out in houses of the moderately well-to-do, especially tradesmen, publicans, grocers, bakers, who, fearing loss of trade, and perhaps sharing popular prejudices against removal to hospital, are very adverse to interference on the part of the sanitary authorities. In some cases of scarlet fever that have come before my notice, pressure has been used to try and induce the medical man in attendance not to report the cases or to call them German measles. Has this fear of the cases being reported led to concealment of disease, by the patient's friends calling in a nurse or some unqualified man who is not under a legal penalty to report the case? I cannot find any very strong evidence. Some medical men tell me they think they are called to more cases *in extremis* and see more cases of scarlatinal nephritis than they did before the Act came in force. But such cases there always have been, and I am inclined to think that the majority of such cases are due rather to the ignorance or carelessness of friends and parents than from wilful concealment. I have frequently seen cases of nephritis desquamating, with a history of a sore throat and perhaps a rash a few weeks before, brought to the children's dispensary, and the parents have expressed surprise when such cases have been sent up to the fever ward of the hospital. The scarlatinal attack has perhaps been looked upon as a 'sore throat' or 'measles' not requiring the services of a doctor, and only when dropsy has set in have they called in medical aid. If real and flagrant cases of concealment of disease are detected in which no qualified man was called in, it behoves the health authorities to put the powers which their Act confers into force and demand the full penalty of 5*l*. for the offence. It would be a grievous thing if the unqualified proprietors of 'People's dispensaries' were to profit by the unpopularity of the medical profession through their faithfully carrying out the letter of the law. But I confess that I have never seen or heard anything that would lead me to believe that concealment of disease exists to any extent.

Friction at times has, I believe, occurred between

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medical men attending fever cases and the health authorities upon the necessity or otherwise of removing cases to hospital. Cases can only be removed to hospital against the wishes of the friends on a certificate of a qualified medical practitioner, stating that the patient is without proper lodging or accommodation, in addition to an order signed by a justice of the peace. As far as I know, legal compulsion is not resorted to in Manchester, but pressure is constantly brought to bear in those cases where it is thought desirable to insist upon removal. Thus tradesmen may have the option of shutting up their shops, or having a policeman stationed at their doors, or sending their children to hospital, and having their houses disinfected. Journeymen, labourers, postmen, clerks have to discontinue their work as long as there is infectious disease in the house. The whole question necessarily turns upon the amount of isolation which can be effected in the house, more especially when the house contains a shop, and here naturally the opinion of the medical attendant ought to be allowed great weight. He is in a position to judge far better than an inspector, and to give his patients the best counsel on the subject. It is needless to say that the health authorities are quite right in insisting that no infectious case should remain in a house where provisions are sold unless the patients can be nursed in one room or storey and have attendants who have no other duties to perform except to nurse the sick. They should also be in a position to retain the services of a medical adviser for the many weeks that the disease and its convalescence lasts. I believe, and I can speak from personal experience, that the inspectors of the health department of this city are both civil and anxious to do their duty; but, if any difficulty occurs, a personal visit or letter direct to the medical officer of health would go far to remove the difficulty.

Another matter of some importance in connection with the difficulty of carrying out the Act is the question of a correct diagnosis being made by the medical attendant. We all know the difficulty, nay sometimes impossibility, of diagnosing scarlet fever, small-pox, or typhus, in an early stage, and we can all probably recall mistakes which we have made. A great responsibility rests upon all concerned. Cases of, say, pneumonia or measles may be reported as scarlet fever, sent up to hospital in an ambulance with scarlet fever cases, and may easily contract the very disease they were sent into hospital to be cured of. I have seen cases of what were probably measles or rötheln, sent up as scarlet fever, received into the fever ward on the strength of the medical certificate given a day or two before, and having the remains of an indefinite rash, acquire scarlet fever, and even die. It may be perfectly impossible at times to say whether a child has recently passed through a mild attack of scarlet fever or not. Such cases are frequently a source of embarrassment to the medical officers of hospitals, for they cannot always have special wards at liberty, and nothing tends so much to damage the reputation of a hospital or the medical profession as to have children contract any new disease in a fever hospital. It is incumbent upon both the medical attendant who certifies the case and the medical officer who receives the case into hospital to use every pains in making a diagnosis, and if the former is in doubt it would be much wiser to let the case stay at home for twenty-four hours more, or at least express the doubt he feels in a note when he certifies the case. For, in the reputation which a fever hospital has among the poor will depend very much the difficulty or otherwise of obtaining the consent of friends or parents to allow their relatives to be removed.

What, then, has been the result of the two years' working of the provisional order in this city? It has been the means of supplying information of the greatest value to the health authorities, enabling them to collect statistics of the operations of zymotic disease unattainable before. Acting energetically on the information thus received, they have sent many more infectious cases to hospital which, prior to the Act, would have been centres for the spread of infection, and these results have been attained with comparatively little friction between the health authorities and the medical profession. Surely these results are satisfactory, and augur well for the future.

He can hardly be deemed over-sanguine who believes that by means of efficient vaccination, improved dwellings for the working classes, thorough and prompt removal of refuse, isolation of the infectious sick, that epidemics of small-pox, typhus, and typhoid are things of the past, and that, in the new era just begun, the health authorities have in their recently acquired powers formidable weapons for combating the epidemics of scarlet fever, which year by year have desolated so many families and claimed so many youthful victims in our midst.

The causes of these epidemics are complex, and, in many ways, mysterious, and we may have years to wait for signal success; but at least we may gather hope to-day from the belief that if we cannot stamp out this modern plague, we can rob it of half its terrors and save many lives.

THE Royal Manchester and North Lancashire Agricultural Society have awarded the silver medal for improvements in heating apparatus to Mr. Renton Gibbs, heating engineer, Liverpool, who exhibited his patent boiler, &c., at their late show held in Stanley Park, Liverpool.

A GENTLE HINT.—The Local Government Board, in writing to the Arlecdon and Frizington Local Board and Urban Sanitary Authority, informing them of the death of Dr. Syme, said 'they trusted that when another medical officer of health was appointed, they would make such an increase in the salary as would be satisfactory.'

THE HEALTH EXHIBITION.—A distinct feature in the forthcoming International Health Exhibition promises to be the representation of an Indian village and tea garden, projected by Mr. C. Purdon Clarke. There will be the tea garden, with the plant growing; the tea house where the beverage will be served by native attendants; and also a pickle establishment, just as it exists in India. The native families needed for the completeness of this picture of native life are to be brought over from Bombay and Darjeeling; and the experiment will be conducted on the only sound principle applicable to exhibitions—viz., that of being self-supporting.

PROSPECTIVE SANITARY LEGISLATION.—Sir J. M'Garel Hogg has given notice to bring in a Bill to confer further powers on the Metropolitan Board of Works in relation to the supply of water to the metropolis; Mr. W. James to bring in a Bill to amend the law relating to the inclosure of commons; and Mr. Cohen of a Bill to secure compensation for occupiers and tenants of houses in certain cases when dwellings are taken or demolished under statutory or compulsory powers; Mr. A. J. Balfour will call attention to the condition of dwellings in crowded parts of large towns, and move a resolution; and Dr. Cameron will bring in a Bill to provide for the regulation of cremation and other modes of disposing of the dead.

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HINTS TO SANITARY INSPECTORS.

(*Continued from page* 351.)

CHAPTER IV.—(*Continued.*)

FAULTS OF DRAINAGE IN HOUSES.

§ 34. *Water-Closets.*

IT is a matter of the greatest importance that the sanitary inspector should be fully acquainted with the various kinds of closets and their methods of working, because, when out of order, or when improperly chosen or fixed, they will generally be found to be the cause of most of the complaints made by the inmates of a house. As a matter of course, he would know that all closets should be confined as much as possible to one part of a house, and be fixed one over the other in a projecting building specially erected for them, with cross windows to the outside air, and with sufficient ventilation. It does not lie, however, within his province to condemn a house because this provision has not been made by the architect or builder, though he may wisely point out the disabilities under which a house rests, when such a precaution has not been taken.

It is far too common to find, even in the best town houses, closets fixed in the most improper places; for instance, at the tops of staircases, opposite the bedroom doors, and even in small rooms opening into the very bedrooms themselves.

Sometimes there are no windows from these closet spaces, or any means of ventilation, not even a shaft carried up to above the roof, and all the light which the closet rooms can obtain is by means of glass panels in the doors. The inspector should carefully notice such conditions as these, and be able to point out how inconsistent they are with health.

When he has been called into a house where smells obtain in the neighbourhood of a closet, and which cannot be traced to a want of ventilation such as is above referred to, he might insist upon the closet being taken down, so as to examine everything in connection with it above the floor line; and, if the smell still continue, the floor should be taken up and a still further exploration made. It may happen that the closet apparatus has not been properly bedded, or connected with the soil-pipe, and he may find rags, putty, and red lead tinkerings of all kinds, which can only be removed by proper plumbing. If the soil-pipe has become cracked through age, or eaten into holes by drain gases or sewer air, from want of ventilation in the soil-pipe, it will be necessary to provide a new soil-pipe properly ventilated, and a proper connection of the same with the soil-pipe.

Even when the soil-pipe and the junctioning of the closet to the same is correct, the inspector ought to insist upon taking down the seat, and oftener than otherwise he will discover that the cause of the smell complained of is due to the presence of bed-chamber slops, which, for want of a proper slop-closet convenience, have remained in the safe of the closet, or have saturated the wood floor in cases where no safe has been provided. Closets inside a house should always be provided with lead safes underneath, with overflows. But such overflows, which guard the ceilings below from the effects due to burst pipes and overflowing closets, should never be taken into the soil-pipe, or into the trap of the closet, as they too frequently are, thus forming a highway for the foul air in the soil-pipes into the house whenever there is no trapping water in the small syphon which generally connects the wastes of safes or traps so treated. Even weeping pipes, so arranged in connection with the closet that each usage of them is supposed to charge the trap of the lead safe, must be looked upon with suspicion. The proper way to deal with the waste of a lead safe, is to take a small inch pipe from it through the nearest wall opening in the outer air, projecting it sufficiently beyond the line of wall, so that if it drips, whilst giving notice that something is wrong with the closet, it may not damage the wall. A small brass or copper light flap should also be fixed at the end of this waste pipe, so as to keep out the cold air. The general condition of an evil closet arrangement will mostly be seen on the underside of the seat. If a blackness is seen there, corresponding with the orifice of the seat, this has been caused by the escape of drain gases into the house. As a matter of course everyone now knows, or should know, that when the house drain has not been disconnected from the sewer, and the soil-pipe ventilated, the drain gases are apt to saturate the trapping water of the closet, and give themselves off into the closet room. This is a very common discovery to make.

A great deal necessarily depends upon the kind of closet chosen, and it may be taken for granted that a *pan* closet is the very worst to make choice of for any part of a house whatever, inasmuch as the containers generally hold a quantity of foul air ready to be delivered into the room when the handle is pulled. The law is in such a state at present, however, that *pan* closets cannot necessarily be condemned provided that they are not past properly cleansing out. It is just as well, however, to know that this kind of closet is now almost universally reprobated, and that almost any other pattern of closet, the deep *hopper* excepted, is to be preferred to it. Possibly the best kind of closet for the interior of a town house is a *valve* closet, so arranged in its parts with regard to the overflow of the basin that every time the basin is flushed a certain portion of the flushing water is delivered from the closet supply pipe, so as to keep the syphon-trap of the basin overflow pipe always charged with water. It would be not only unnecessary but invidious here to recommend any particular make of the many patterns of closets extant, but where the pattern of the closet to be used is inside the house, above the basement, the above general remarks will be found useful.

The worst kind of closets in a household are generally to be found in the basement for the use of servants, and here will be found the *long hopper* closet, with its spiral flushing, which is, in fact, no flushing at all, and which can under no possibilities properly drive the excreta out of the syphon below. It always presents a filthy interior, and should never be chosen. The best closets for servants' use are the *short hoppers*, or, still better, any of the many *wash-out* closets now to be obtained at any sanitary establishment.

Servants are never to be depended upon to properly flush out their closet, and the result is that there is generally, after a time, a stoppage of the drain in their immediate neighbourhood. Closets in use by servants should always be fitted up with self-acting flushing boxes overhead, which require only a touch of the depending chain and ring to release the whole of the allotted two or three gallons,

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and in cases where the cistern is not sufficiently high above the seat to allow of these flushing-cisterns, there are other contrivances in the market which effectually serve the same purpose, and yield a sufficiency of flushing water without the necessity of holding up the handle for a long period of time.

In cases where closets are placed one above the other, and even under other conditions, what is known of syphonage is of frequent occurrence, whereby the trapping water of one closet is sucked out of the trap by the putting in motion of another closet. It would be altogether out of place in these 'Hints to Sanitary Inspectors' to enter into the causes of this in detail. Moreover, the causes are very various, and it would be wise for the inspector to take a special note of cases where syphonage occurs, for it is perhaps one of the most perplexing matters which occurs in connection with the water-closet system.

A great deal might be said in connection with the traps of water-closets, whether they should be D traps, or what are called S traps. The plumbing world is divided into two camps, some advocating the former and others the latter. The D trap is, to say the least of it, most apt to foul and collect soil around its interior, whenever there is a paucity of flushing supply. The S trap is more cleanly, and the soil is certainly easier swept out of the trap when this pattern has been provided. At present the use of both traps is optional, but there can be little doubt that the use of the S trap is to be preferred.

§ 35. *Water Supply to Closets, Sinks, &c., inside the House.*

Assuming that there is an unpolluted source of water supply, whether it be from a reservoir or from a well, the water can nevertheless be contaminated in many ways upon entering a house from the *main*, and the inspector should be acquainted with the causes which lead to this pollution.

Cisterns in general use belong to seven classes—*a*, cemented cisterns, generally found in basements; *b*, slate cisterns; *c*, stone cisterns; *d*, ancient cast-lead cisterns; *e*, wood cisterns, lined with milled lead; *f*, cast-iron cisterns, with pieces bolted together; and *g*, galvanised wrought-iron cisterns. A cistern cannot be condemned because the surface which it presents to the water is of lead, because after a time its surface acquires a coat which mostly preserves the water from being attacked. Neither can galvanised iron cisterns be condemned, although there is a certain action of water upon the zinc coating. Where, however, these cisterns are in use they should not be of too great water-holding capacity, but allow little more than a sufficiency for a couple of days' use. Too frequently they hold sufficient for a week's supply, in which cases the water becomes stagnant, and is more likely to suffer from the action of the metals. The best kind of house cistern is the slate cistern, and this should be preferred to one of any of the other classes above enumerated wherever the strength of its support is sufficient. Some even go so far as to have the interior of the slate cistern enamelled white, the better to observe the presence of any impurity or sediment in the water. Whilst upon the question of cisterns, it may here be observed that all cisterns should be provided with covers to keep off air impurities, and should be properly protected from frost.

It will be noticed that what is here alluded to is a cistern supply with an intermittent service, and not a constant supply from a main always charged from a reservoir. Water mains are liable to many kinds of pollution, but it will be sufficient to note one, which is the chief one—viz., the liability, nay, the certainty, some time or other, of such a pollution whenever the main is made to supply a water-closet on its way to the cistern or to any draw-off tap. It is not an uncommon thing to find basement closets so supplied without the interposition of a cistern or disconnecting apparatus.

Water stored in cisterns can be polluted in various ways. For instance, it may have a standing waste in direct communication with the soil-pipe or the trap of a water-closet, or an overflow-pipe from the cistern may have been treated in a similar fashion. Again, the waste of the cistern may have been led into a rain-water pipe running direct into the drain, or it may deliver the overflow water over the orifice of a filthy sink. When an inspector examines a cistern-supply, this should be the subject of his first search, and he should insist upon the overflow-pipe or waste-pipe delivering cleanly in the open air.

It is safe to say, as a thing not to be disproved, despite all the contrivances in the shape of valves, &c., that no water from any cistern which supplies water-closets is able to yield a pure supply for drinking, or even cooking purposes. The inspector will be sure to discover a great many instances where the butler's pantry, scullery, or housekeeper's sink is supplied from a cistern supplying a servant's closet, or some closet upstairs, as well as the feed-cistern to the low-pressure boiler in the kitchen. In a similar manner he will often discover that an upstairs cistern supplying the bedroom drinking water, the housemaids' sink, and nursery draw-off tap and high-pressure boiler, supplies at the same time, in direct fashion, flushing water for one or more closets. He should set his face steadfastly against this practice, and either insist upon a separate cistern for the supply of drinking water—placed otherwise than in the interior of the roof, where dust is rampant—or upon the provision of disconnecting water-waste preventers above each closet with separate ball-valves.

(*To be continued.*)

NATIONAL HEALTH SOCIETY.—The Worshipful Company of Clothworkers has been pleased to grant a donation of 21*l.* to the National Health Society, 44 Berners Street, W.

MESSRS. PAGE & PRATT, printers, Ludgate Circus Buildings, have been summoned, under the Smoke Nuisances Act, for so negligently using a furnace that the smoke was not effectually consumed or burnt. Alderman Whitehead, presiding at the Guildhall Police-court, under the powers of the Summary Jurisdiction Act, modified the minimum penalty of 2*l.* to 10*s.* and costs. A similar fine was inflicted on Mr. Thomas Thorn, manager of the People's Café Company, Limited, Ludgate Circus Buildings, under like circumstances.

VENTILATION OF PUBLIC BUILDINGS.—Messrs. Robert Boyle & Son, of 64 Holborn Viaduct and Glasgow, have recently applied their system of ventilation to the New Princes Theatre, Coventry Street; Grosvenor Club, Chester; Constitutional Club, Exeter; H.M. Prison, Dartmoor; H.M. Prison, Derby; New Fever Hospital, Birmingham; Christ's Hospital, Hertford; Military Barracks, Bombay; Local Offices, Gateshead; New Audit Offices, N.E.R., Newcastle-on-Tyne; and Post Office, Newcastle-on-Tyne.

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THE EXCESSIVE DEATH-RATE OF NEWCASTLE.

(FROM OUR OWN CORRESPONDENT.)

JUST upon the close of last year, Mr. Armstrong, the medical officer of health, issued his report on the increased death-rate of Newcastle during the third quarter of the year, ending Sept. 29, 1883. The subject is dealt with in an exhaustive and masterly manner, in a voluminous pamphlet, to which is added a plan of the city, showing the locality of the most notorious fever dens, and also a lithograph illustrating the most approved method of preventing the admission of sewer-gas into houses, &c. The total number of deaths in the city during the above period was 1,009, of which 520 were those of children under five years of age, 277 being those of infants under one year old, showing at once that certain peculiar conditions exist, not only seriously inimical but fatally destructive to infant life. Space will not admit of our noticing all the predisposing causes which Mr. Armstrong enumerates and supports by well-authenticated facts and figures, as chief factors of the excessive mortality. We may, however, refer to a few which appear to have the most significant bearing on the subject. According to the above-mentioned plan it is evident that the greatest number of cases with fatal results have occurred where ground-crowding also exists to the greatest extent, the districts being chiefly populated by the poorer labouring class, who, as is the rule in that city, occupy dwellings consisting of but one or two rooms, many of them sadly deficient in sanitary requirements. From an abstract of the last census returns the average number of persons per house in Newcastle is stated to be 7·2, which is exceeded only by two other places in England. These figures, however, cannot be relied on absolutely, as the definition of 'a house' is differently interpreted throughout the country. There is no doubt but that overcrowding does exist to a serious extent in the older parts of the city, for which the Corporation themselves cannot be held blameless, as within the past twenty years they have unhoused at least 2,000 poor people to make way for new street improvements, and have provided no accommodation for the evicted persons, who were left to find shelter as best they could. Mr. Armstrong suggests that 500 cubic feet of air-space for each person should be the minimum allowance in future; but how such a desirable regulation can be enforced where it is at present most required we are at a loss to conceive.

It may be noted that 251 of the deaths enumerated in the foregoing return belonged to the miasmatic order of zymotic diseases, the most prevalent of which were—measles 129 cases, diarrhœa 56 cases, and scarlet fever 22 cases. Towards the end of the year there has been a marked increase in cases of scarlet fever, which has also continued since the commencement of this year. Mr. Armstrong comments strongly and justly on the evil effects of badly constructed drains and w.c.'s, the existence of slaughter-houses in unsuitable localities, the large percentage of open ashpits in populous neighbourhoods, and other matters which should not have been allowed to exist at first if the Corporation officers had done their duty. These evils having received official toleration for several years, cannot now be altered or removed without enormous expense, which would be sure to evoke the most determined opposition of property-owners, who originally executed the work with the full knowledge and sanction of the Corporation officials.

One of the most salient features of the report, bearing on the excessive infant mortality referred to, is the paragraphs devoted to school life, which are well worth pondering over. On page 44 of the report it states that it has been found—

'(*a*) That parents often justly blame school for spread of disease to their children.

'(*b*) That principals of schools have sometimes difficulty in preventing children of infected houses from coming to school.

'(*c*) That school principals are not always sufficiently careful to prevent children from coming from such houses.'

It is well known that in all successful schools there is overcrowding, and that the amount of air-space allowed is often not more than half of what is absolutely necessary for the healthy physical development of the children. A few years ago an epidemic of measles broke out in one of the public schools in Newcastle, about 12 per cent. of the total number of children being attacked with it. It was found on investigation that there was a sad deficiency in the space allowed, particularly for the infant class. During the first week of the current year we have heard of two fatal cases in one family, the result of infection caught at that same school, the house of the parents being a pattern of cleanliness! A still more careless disregard of overcrowding is often observable in Sunday-schools, and Mr. Armstrong gives one instance that came under his observation where the poor children were packed so tightly that they were allowed only the incredibly small breathing space of three square feet. As he aptly observes, this was indeed preparing them for a better world. With such facts before us, we need not be astonished at the massacre of the innocents which is now going on in Newcastle. Every facility and encouragement being thus given to the spread of infection, it is carried home by the poor children to their crowded and unhealthy dwellings. The whole family is probably infected for want of means of isolation, and the youngest or weakest too often succumb. From long experience and continued observation on the spot, the writer is convinced that the present excessive death-rate of Newcastle results in no small degree from the want of efficient medical supervision of schools, whence infectious disease is disseminated broadcast by the culpable carelessness of parents and neglect of teachers. It must be obvious that, whilst the best-regulated household, where scrupulous cleanliness is the rule, is not proof against the admission of infection in this way, its introduction into dirty houses is almost certain to be followed by disastrous effects; too much vigilance, therefore, cannot be exercised in order to prevent the propagation and spread of zymotic disease in schools. The medical officer of health also refers to the baneful effects of building on *made* ground, which is practised in Newcastle as elsewhere. He also dwells on the spread of infection through contaminated milk, as also by books from public libraries; and, in conclusion, justly observes that the best efforts of sanitarians are of no avail without proper support by the public themselves, who should make themselves acquainted with at least the elements of hygiene, for which purpose every encouragement should be given for the delivery of popular lectures on sanitary matters, and the

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formation of sanitary associations amongst the educated classes. There is ample scope for a Miss Octavia Hill in Newcastle.

On January 12, the Recorder of Newcastle (Mr. Digby Seymour, Q.C.) spent twelve hours in visiting some of the worst slums of Newcastle, accompanied during a large portion of the time by the bishop of the diocese, and attended by officials thoroughly acquainted with the district and its inhabitants. The Recorder of Newcastle is not a fresh convert to the new-born zeal recently displayed as to the proper housing of the poor, but has on many occasions—both in his judicial capacity and otherwise—expressed his decided conviction that the slums of our large cities are the chief nurseries of disease and crime, and that the health and morals of the community must needs suffer so long as they are allowed to exist. His opinions were fully confirmed by a searching personal inspection. In his charge to the grand jury at the quarter sessions held on January 14, Mr. Seymour dwelt at considerable length on the deplorable scenes which both the bishop and himself had recently witnessed, and to which his attention had been particularly drawn by an article written by a contributor to the *Newcastle Daily Chronicle*, who also accompanied him. The exigencies of space prevent us giving the remarks of the Recorder *in extenso*, but the following are a part of them. He said that he saw with his own eyes, smelt with his own nose, trod with his own feet, the nauseous centres of poverty and sometimes of crime, and generally of filth, which formed the subject of the pen of the above-mentioned writer. He saw water-closets without water, and closets which could not be closed; he found water-closets opening into the street into which any person could go, and built into recesses taken from rooms in which a number of persons slept, and divided therefrom by a thin and most inadequate partition. There were closets at the end of dark passages, which they could only detect by striking a match, which were in such a state of slop and filth as to be unfit to use by the poorest of persons. There were closets where the only escape for impure air was by an aperture at the top, whence it was disseminated through the whole of the building. The visitors saw sights worse than that. They saw outside the houses, gratings clogged with human excrement, and sewers and gratings inside houses in the same miserable state. In answer to questions put to the people living in these places by the bishop, they excused themselves for the filthy condition by alleging the want of proper accommodation in the neighbourhood. They saw ceilings ready to fall on the people beneath, protected only by quarter-inch boards, and bending under the superincumbent mass. They saw walls in a condition utterly unfit for houses for human beings to occupy. In a yard in Meeting-House Lane they saw a pool of pestiferous matter, about 24 feet long, 12 feet wide, and from 6 to 8 inches deep, which a policeman said had been there four or five months to his personal knowledge. They visited several of the rooms inhabited by these wretched people, and found the inside to correspond in a great measure to the miserable surroundings outside. Poverty, squalor, and filth were prominent features. The inmates told some piteous tales. A visit was afterwards paid to some of the common lodging-houses, which being under police supervision were found to be in a most satisfactory state. As a prompt, if but partial, remedy for this deplorable state of things, the Recorder urged the authorities to put in force the power which Sir Charles Dilke showed they possessed under the 90th section of the Public Health Act, 1875, to deal with unhealthy tenemented property. He also advocated the erection of more blocks of improved dwellings in the city. The experience of the Newcastle Industrial Dwellings Company showed that capital laid out in this way would pay, and that benevolence and finance might work hand in hand where there was such ample scope.

The Chairman of the Newcastle Board of Guardians caused inquiries to be made into certain cases of destitution mentioned by the Recorder, and has stated that the miserable condition of the people referred to is clearly attributable to their own vicious habits, of which of course the Recorder was ignorant. The guardians are in no way responsible, as the sufferers belong to that class of poor who always will be poor, and on whom sympathy is in a great measure thrown away. The Recorder has replied that he never blamed the guardians; but it must be obvious that blame must rest somewhere, and urges every authority in Newcastle to lend a hand in putting down this disgraceful blot on the fair fame of the city, ever remembering 'that property has its duties as well as its rights.' He also remarks, 'till other hearts can be touched by such spectacles, God help the famishing and suffering—aye, and criminal—poor in the City of Newcastle!'

A few days after his visit to the slums, the Recorder inspected the buildings belonging to the Newcastle Improved Industrial Dwellings Company. He was shown the various arrangements found there for the comfort and convenience of the tenants by Mr. John Price, resident director of the company. He also inspected the rooms of several of the tenants, and expressed his gratification at what he had seen, in striking contrast to the miserable scenes he had witnessed in the immediate neighbourhood, but a few days previously.

It is satisfactory to learn that the authorities are now taking energetic steps to remedy the evils complained of, including the adoption of the 90th section of the Public Health Act, 1875.

MR. EDWIN CHADWICK, C.B.—'The living leader of the sanitary reformation of this century'—Mr. Edwin Chadwick—as Dr. B. W. Richardson has justly styled him, completed his eighty-fourth year on Jan. 24, having been born at Longsight, near Manchester, on Jan. 24, 1800.

THE POPULATION OF FRANCE.—A very interesting series of statistics as to the population of France, apart from the quinquennial census, is being issued by the Ministry of Agriculture, the object of them being to obtain an approximate estimate as to whether the total number of inhabitants in France will be greater or less at the close of the century than it is now. The figures so far worked out tend to prove that there is likely to be a decrease in the population, for though from 1806, when the total population was 29,107,425, to 1872 there was an annual increase of 38 per 10,000 inhabitants, that increase has since dropped to 26 per 10,000. There is reason to believe that the rate of increase is still further declining, and there are not upon the average more than two children to each family. The returns also state that out of every 100 inhabitants of Paris only 36 are born in the department, 57 coming from the provinces, and seven from abroad. Moreover, while the number of births remains nearly stationary in France, the rate of infant mortality is enormous, being as much as 27 per cent. in Normandy and 15 per cent. for the whole of France.

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HOUSING OF THE POOR IN BIRMINGHAM AND THE BLACK COUNTRY.

(FROM OUR OWN CORRESPONDENT.)

[*Second Article.*]

THE Wolverhampton Town Council were to have taken into consideration at their January meeting the appointment of a committee, 'with power to take evidence and to inquire into and report as to the sanitary condition of the dwellings of the poor in the borough, and whether they recommend any, and, if so, what, steps to be taken for the improvement of such dwellings, and that the town clerk report as to the powers vested in the council to deal with the subject.' But, owing to the pressure of other business, the motion was withdrawn, with a view to its being introduced at the next meeting. Meanwhile, independent investigations have been going on in the borough which show the necessity for action of some kind being taken as speedily as possible. One wonders how long the present state of things would have been allowed to continue in so many of the largest and most important towns had it not been for the revelations which so startled the public with reference to the London poor, and thereby roused attention to the whole subject. The present state of things is no new one; there has been urgent need for years past that active measures should be taken in the interests of the community at large to ameliorate the conditions under which too many of the poor live; and the fact that after so much progress has been made in sanitary science the most casual inquiry should bring to light circumstances which would shock a community of savages is only another proof of the ease with which the official conscience was in many instances satisfied with the superficial discharge of sanitary work. As in Birmingham, so in Wolverhampton, after the passing of the Artisans' Dwellings Act the Corporation made a clean and wholesale sweep—though not in the latter case equal in extent to the former—of a number of dilapidated and unhealthy houses in the neighbourhood of Stafford Street, for the purpose of carrying out an improvement scheme. But, as in the case of Birmingham also, they omitted to make provision for the outcasts. The so-called Artisans' Dwellings Improvement Committee took most efficient measures to empty the 'condemned area,' but they did not provide homes for those they thus ejected, and accordingly they had to seek refuge where it could be found. A large number removed to the east end of the town, where already the dark, narrow streets and dingy courts were overfull. Whether as the result of this or not, the fact is shown by the published returns that since the commencement of 1880, soon after which this migratory movement commenced, the rate of mortality in this east end district has been steadily increasing, and at the end of the last municipal year had reached the percentage of 27·4 per 1,000 of the population. As is usual in the poorest quarters of all large towns, beershops, pawnshops, and brothels here abound, vice and degradation in all its shamelessness and hideousness is seen, and drunken orgies are frequent, often being put a stop to only by the removal of the participants to the police-station. The infantile mortality is very large, as an instance of which it will be sufficient to quote the November number of the parish magazine for this division of the borough, in which is recorded the fact that out of ten deaths mentioned in the obituary nine were infants. Horseley Fields is the main thoroughfare through this east end of Wolverhampton; and, although in the streets and courts branching off from this artery there is much more of filth, squalor, and insalubrity than would be desirable even if spread over the whole town, all the homes are not marked by these conditions. There are many of the inhabitants who lead sober, respectable, industrious lives, and do their utmost to make the very best of the circumstances and conditions under which they live. Clean floors, polished furniture, whitewashed walls, and well-tended window-plants are to be found in some of the houses, and form a generally reliable criterion by which to estimate the character of the occupants, even though some of the houses themselves are not of the most habitable description. But the discouragement to efforts of this kind is great. And it must be confessed that, judging from the interiors of some of the tenements, the tenants do not seem to require much in the way of discouragement to keep them from indulging in cleanly and decent habits. There is also no doubt that good property is often rendered filthy and untenantable by vicious and degraded people, who seem to lack even the common instincts of the brute, and that in too many cases the people have become so wedded to filth that it would take the continual personal inspection of an army of sanitary inspectors, armed with the most plenary powers, to bring about their divorce therefrom.

On the whole it would seem that the deeper depths of misery and wretchedness in the housing of the poor is not prevalent in Wolverhampton; nor is overcrowding carried to the extent seen in Birmingham and some of the towns between. There is a large population of very poor people, and a great deal of poverty. Many of the tenements have but three rooms—two upstairs, and one down, and some of them do not appear to have had anything done to them in the shape of whitewashing or papering for years; painting would seem to be not even thought of. In a place called 'Irish Row' the tenements have but one room on the ground floor and one upstairs, some of them no back doors, one pump for the use of the whole court, and privies close facing the 'front' doors. Perhaps the most wretched and what should be uninhabitable places in the borough are a lot of one-storied hovels along the Willenhall Road. They have the advantage of being openly situated, but are without any proper sanitary arrangements. In respect to the sanitary conditions which prevail in the more crowded localities there would seem to be ample room for improvement, although they are not worse in Wolverhampton than in other parts of the Black Country district. Scarce a meeting of a local board or sanitary authority for some part of the district takes place at which a report is not made of soil from the privies overflowing or filtering into adjoining ashpits, and the greatest possible difficulty is often experienced in inducing the landlords to put the places into the necessary state of repair. In many cases the privies adjoin what in these parts is called the brewhouse, which answers to the kitchen or scullery of London and the south, and occasionally it is found that the liquid penetrates through the bricks and runs down the wall inside. There appears to have been, till within the last few years, an utter want of decency as well as of sanitary precaution manifested about the erection of these places. In

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some courts they will be found ranged side by side within three or four yards of the back doors—in many cases even of the front doors—of the houses, often exposed to public gaze, and not infrequently with unhinged doors, or with no doors at all. Under similar conditions there are plenty of them to be seen on waste ground by the side and within a few yards of the highway, along the main thoroughfares, and by the side of the railways, generally with the entrance facing to and in full view of the road or railway. The want of any system of deep drainage has tended to greatly aggravate the evil, and where the night-soil contractor fails to attend to his work punctually, or is prevented by frost or other causes from doing so, privies have been reported as overflowing until the soil stood in pools on the floor or ran down into the yard. Another source of mischief is the practice many people have of emptying the whole of the slop-water of the house into the ash-pit. These are matters well within the cognisance of any one in the habit of attending meetings of sanitary authorities in any part of the Black Country district. The want of proper urinal accommodation causes indecency and cases of exposure in the streets to be frequent and glaring. The street channels, too, are generally filled with foul slop-water thrown down the house-sinks, this being the only method by which it can be carried off by the storm-water drains. Only those who have lived in the district can realise the extent to which the want of adequate sanitary regulations and appliances prevails. But it is not difficult to understand the demoralising effect produced upon the ignorant and unthinking classes by the conditions not only attached to the houses they inhabit, but also prevailing wherever they go, or the disheartening effect produced upon those with cleanly habits but small means, and therefore not in a position to choose their place of abode. Next to the provision of some better houses for the poor must certainly rank in importance improved sanitary arrangements, a more perfect system of sewerage, and a greater regard for privacy and decency. The local authorities have for some time past shown that they are waking up to the realisation of the importance of these matters, so that we may hope for an improvement.

The Artisans' Dwellings Committee appointed by the Birmingham Corporation to inquire into the real condition of the dwellings of the poor in the borough, with a view to the amelioration thereof, have lost no time in getting to work. A close inspection of each of the wards into which the borough is divided is being made, and elaborate reports have been presented of those in which the inspections are completed.

The result has been to show that even the medical officer of health was not aware of the existence of some of the worst rookeries in the town. In St. George's Ward, the first inspected, they found houses which ought to have been demolished, houses which were in a dilapidated state, saturated with filth, with damp walls, and altogether unfit for habitation. In one street Dr. Hill (medical officer) stated that the only thing that kept the tenants (ten in number) in one of the houses from being suffocated was the ventilation afforded by broken windows and doors. Some of the houses were not cleansed or whitewashed oftener than once in seven years, and one had not been cleansed for fourteen years. Many of the people, if they wished to be clean, could not be; they had not the means. Married people, with grown-up sons and daughters, were found to be occupying one sleeping-room, and in one case, a woman and her son slept in one bed. In this same ward a number of houses were found entirely unfit for habitation, although they were occupied, and Dr. Hill said his attention had not been drawn to the property before. Dr. Foster, a member of the committee, seems to have hit a right nail on the head when he remarked that in courts where a child had no clothing but a shirt, where the people were saturated with drink and wanted food, they lost all sense of cleanliness, and, unless their surroundings were improved, they did not acquire it again. The evidence tends to show how grossly in many cases the landlords and agents of these poor tenements impose upon the people who pay so much more than the value of the accommodation they afford; while, on the other hand, some of the places are occupied by the vilest of the vile, who ransack the buildings and everything that can be removed, and do their best to render them even more uninhabitable than before. Sufficient has already been shown to fully warrant the most searching investigation, and to provide the sanitary authority of the town with work for many months to come. The actual state of things appears if anything to be even worse than anyone imagined.

NOTIFICATION OF INFECTIOUS DISEASES.

By G. H. PERCIVAL, M.B.

THE arguments (pro and con) on this subject have lately been much before the public, especially in some of our medical contemporaries. There still remain some points that do not seem to have received the attention they deserve, and the subject requires thorough ventilation before any legislation is attempted. It stands to reason that some provision should be made for notification of such diseases, and it is extraordinary that in this nineteenth century so much more regard should be paid to the lives and health of cattle than of human beings. An epidemic of foot and mouth disease is now unfortunately spreading throughout the country, and what do we see? Field-gates placarded with notices that the disease exists in them, other notices to drovers concerning the existence and locality of infected centres; and every attempt, in short, made to check the spread of the disease, even to the extent of severe fines, if there is the least irregularity in the forms by which cattle are removed from one district to another. But should scarlet fever or any other serious epidemic arise in a village, how different is the result. As a rule, the fact is hushed up as long as possible, and, when it does leak out, every attempt is made to make light of it, whilst even in the most flagrant cases of rash exposure, resulting in the spread of the disease from one person to another, it is almost impossible to prevail on the sanitary authority to order a prosecution. Such a state of affairs cannot be right; and if it is the duty of the State to make laws for the prevention of infectious disease in cattle, surely it must be much more its duty to prevent the spread of such diseases in human beings. No medical man will gainsay this; it is more the manner in which Government propose to deal with this question to which they object, rather than to the principle itself. It is not a just thing to impose on

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a medical man the duty of giving notice concerning his patient's illness, nor is such a law likely to effect its object. In the analogous case of cattle disease the duty and responsibility are not thrown on the veterinary surgeon, because such a scheme could not work, nor will it work in the cases now under consideration. It is amongst the poorer classes that there is the greatest carelessness in respect to these diseases, and it is these that we must reach if we intend to thoroughly stamp out such diseases at their commencement. Now the poor have already learnt one chief lesson in respect to these matters, and that is, never to call in a doctor for such diseases unless death is almost absolutely imminent. They find that the doctor often reports the case to the medical officer of health, and that they are then bound to take certain precautions which give them trouble and which they very much dislike. Scarlet fever has prevailed in a severe form in two villages at some distance from each other in this neighbourhood, and in not a single case has a medical man been called in. Consequently, the disease raged and spread indefinitely before any notice of its appearance was obtained. Now, will it not do a great deal more harm to increase in any degree the odium with which the medical man and his interference (as they style it) are already regarded? For the sake of the health of the patients themselves, as well as the public at large, the householder must be taught that it is his duty to report such cases, and he must be made to do so quite independently of the medical man. This would then in time overcome the fear of calling in a doctor, and the patients themselves would stand a better chance of recovery than under the present system. But to do this much stronger measures must be taken and made compulsory than any that are at present in force. The duty of prosecuting must not be left to the option of the sanitary authority, but it must be made compulsory, and should also act immediately. In some parts the sanitary authority meet only once a month, and to postpone proceedings for that time is often to render them absolutely futile. Shortly, any scheme to be effectual must embrace the following points :—

1. In case of any infectious disease occurring in a house, it must be compulsory, under certain penalties, for the householder to give notice of such disease to the medical officer of health or inspector of nuisances within twenty-four hours.

2. Neglect to call in a medical man, and consequent plea of ignorance, must have no weight in mitigation of punishment.

3. Any case not reported, and coming hereafter under the notice of the medical officer of health or inspector of nuisances, must be reported by them to the clerk of the sanitary authority.

4. The clerk must then, under penalty of a certain fine, if he neglect the duty, take immediate steps to prosecute such cases without waiting to refer the matter to his board.

A bill worked out on these lines would (when the details were filled in) be found to be effectual, and would meet most of the objections at present urged against such legislation.

THE Herne Bay Water Company have been prosecuted by the local board of that place for failing to keep their water-mains charged on the night of Dec. 20, when a serious fire occurred, and the fire brigade had to take their engine down to the sea to get a supply of water. Having been previously convicted of a similar offence, the defendant company were fined 5*l.* and costs.

FORTY YEARS OF HOUSEHOLD SUFFRAGE IN SHEFFIELD, IN REFERENCE TO ITS SANITATION.*

BY JOHN DANIEL LEADER,

Editor of the *Independent*.

THE first town council for Sheffield was elected on Nov. 1, 1843. The new borough included the 30¾ square miles of the parish of Sheffield. This area had, according to the Census of 1841, a population of 110,891. It was divided into nine wards, returning forty-two members, with fourteen aldermen. The three smallest wards, with a united population of 12,830, returned nine members; the five largest, with a population of 87,972, thirty members. In the forty years that have since elapsed, population has not only increased in the whole borough, but the relative population of the wards has greatly changed. The gradual emphasising of these anomalies, as Census after Census was taken, induced the town council, when applying for a local Act in 1871, to obtain additional representation for Brightside and Nether Hallam. These wards now return each six members, and the number of aldermen is correspondingly increased to sixteen.

The new corporation was poor but honest. It inherited no blunders, but also no property. Its whole income was derived from rates. Economy was the first order of the day. No long time elapsed, however, before the need for extended powers was felt. In 1851 the question of adopting the Health of Towns Act, or applying for an Improvement Act, was considered, and the latter course was decided on and approved by the inhabitants in public meeting. A draft Bill was prepared and approved by the town council, but meanwhile a violent agitation had been got up among the cottage property owners, who feared for the immunity of their pigstyes, and dreaded interference with their unsanitary arrangements, and the loss of their exemption from rates. Accordingly, when the Bill was submitted in December to the vote of a public meeting, it was emphatically rejected, and the corporation, after this rebuff, said no more about Improvement Bills for several years. There did slip through, however, in 1852, a Bridges and Streets Act, giving power to erect several much-needed bridges, with approaches, the cost being defrayed by a small special rate. In 1864 the corporation became the local board of health for the borough; and in 1865, under the powers of a general Act of Parliament, the police commissioners handed over to it their duties—two changes which very greatly enlarged the work and the responsibilities of the town council.

The municipal body of Sheffield has incurred a mortgage debt of 722,412*l.*, and has expended 957,965*l.* in property and permanent works. Of this amount 45,788*l.* is for a main drainage scheme, and there is now on hand a further extension of sewers, including purification-of-sewage-works estimated to cost 150,000*l.*, but for which a larger sum will probably be required. A fever hospital has been erected at a cost of 24,000*l.* The health committee has laid out 16,889*l.* in buildings, vans, horses, and other appliances, and it expends yearly some 30,000*l.*, of which more than 18,000*l.* goes in the disposal of night soil. The death-rate of the borough was 25·7 in 1873, 21·4 in 1882. It is one

* Abridged from the *Pall Mall Gazette* of January 21.

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of the distinctions of Sheffield that cellar-dwellings have been almost unknown.

Two sets of public baths have been erected at a united cost of 15,694*l.*, and the number of bathers in the year ending March 25, 1882, was 113,942. The cost of maintenance, interest, and repayment of loans, after deducting the money received from bathers, is 496*l.* There is a cry for more baths, but the expense is a deterrent, the fear of it being aggravated by an absurd misspending of money on the Attercliffe baths.

In 1875 the corporation opened the Weston Park of 12½ acres, which, with the mansion, had cost them 23,339*l.*; the mansion having also been adapted for a museum. In the same year the mayor (Alderman Firth) presented to the town a park of 36 acres, opened by the Prince and Princess of Wales. The Norfolk Park of 60 acres was laid out by the grandfather of the present Duke of Norfolk, who also provided for its maintenance. The present Duke has presented to the town three recreation grounds in populous districts, amounting on the whole to about 26 acres. The corporation has also secured by lease a considerable space of open ground in the Crookes Moor Valley. Within the Weston Park stands the public museum, which cost 8,601*l.*, and contains pictures, natural history, and antiquarian collections and works of art, interesting and instructive to workmen in the local trades. The late Mr. Newton Mappin has bequeathed to the town his collection of pictures, in value approaching 100,000*l.*; and it is hoped that the Ruskin Museum will also find a permanent home in the Weston Park. The visitors to the museum and observatory last year were 129,302.

The Free Public Libraries and Museums Act was adopted by vote of the burgesses in October 1853. There is a central library, with a reading-room much too small for public requirements, and three branch libraries, with reading-rooms larger than are at present needed. The buildings have cost 17,205*l.*, and the maintenance involves an expenditure of 5,344*l.*, including interest and redemption of debt. The libraries contain 72,275 books, and the issues last year (lending and reference) were 415,692. The corporation has several times sought in vain for power to increase the rate beyond the limit of one penny in the pound. There is a great desire to afford other branch libraries so soon as the funds may permit.

In 1875, under the provisional orders of the Local Government Board, a street improvement scheme was entered on, under which some much-needed improvements are in progress in the central and other parts of the town, at a cost of more than half a million. When the work commenced in 1875 the town was only just beginning to feel the reaction from the busy times of 1872 and 1873. Property was at its highest value, and the purchases made for the corporation were very favourable to sellers. Ever since the tendency has been downwards, and it has become difficult for the corporation to effect the sales it had counted on for the redemption of debt, and impossible to realise the prices that had been expected. Further street improvements, much needed, and the erection of a municipal hall are delayed by the present state of trade.

Under the Tramways Act, 1872, the corporation constructed ten miles of tramways leading to four of the suburbs, at a cost of 90,512*l.*, and leased the lines to a tramway company. Since the lines were opened in 1873 there has been continued friction between the tramway company and the corporation. Neither party seems satisfied with the bargain, and assuredly the corporation has no reason to be proud of its share in the achievement. In some cases, where the streets are narrow, the tramways are a great impediment to ordinary street traffic, and have much injured property on their route. Gas, water, markets, and slaughter-houses still remain in private hands.

In 1858, however, the corporation acquired considerable powers over the gas company, and favourable terms were made for consumers. The price of gas is 2*s.* 2*d.* per 1,000 feet, with a reduction to 2*s.* and 1*s.* 10*d.* for large consumers—a rate that compares favourably with the Manchester price of 2*s.* 8*d.* per 1,000. The public lamps cost 24*s.* 2⅝*d.* per 2,200 hours, against 44*s.* paid in 1850. The relations between the water company and the corporation have been much strained since the bursting of the Dale Dyke reservoir in 1864. This disaster introduced a new order of things. The company had to raise about 400,000*l.* to meet its losses; and that it might do this Parliament authorised the addition of 25 per cent. for twenty-five years to the charges for water. The corporation opposed this in vain, and has several times made efforts to buy the works, which have either been abandoned on consideration of the loss that would be involved, or rejected by the company. It is generally expected the scheme of purchase will be revived when the 25 per cent. conceded in 1864 expires. Meantime the town has an abundant supply, day and night, of good water.

The amount of public indebtedness of all the public bodies in the borough in Feb. 1883 was 1,267,957*l.*, and the annual charge 68,628*l.*, or 1*s.* 6⅜*d.* in the pound on the rateable value of the borough.

From the facts above narrated it may be gathered that the corporation has always been a little ahead of public opinion in the desire for improvement, but the lack of corporate property has ever placed it at the mercy of the burgesses, who hold the purse-strings tightly. The cry of expense has been raised, and the hands of the corporation have been tied. The burgesses are thus directly responsible for any shortcomings, and it is very unfair to throw all blame on the town council.

AN extensive scheme of waterworks for the supply of the borough of Evesham with water from the Broadway Hill, one of the Cotswold range, was opened early in January. It is fourteen years since the need for improved sanitary provision for the Worcestershire town was brought prominently before the public, and the idea then was to carry out concurrently a system of drainage and a system of water supply. The drainage scheme, however, was completed seven years ago. Several plans were prospected for water before the present source, which is seven miles from the town, was found. The water is conveyed by pipes to a collecting-tank, and thence to a brick reservoir, 45 yards long, 45 yards broad, and 10 feet 6 inches deep. The supply is estimated at 230,000 gallons per day, enough to supply the wants of three times the present population. Mr. W. McLandsborough, engineer to the Cheltenham Corporation, prepared the scheme, which was carried out by Messrs. Firmstone Brothers, Stourbridge; Evans Brothers, Wolverhampton; J. E. White, Evesham; and Guest and Chrimes, of Rotherham, at a cost not exceeding 12,000*l.* The opening ceremony was conducted by the mayor (Mr. W. Gardner), the water being turned on by Mr. Dixon-Hartland, M.P.

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THE

SANITARY RECORD.

FEBRUARY 15, 1884.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

THE ROYAL COMMISSION ON THE HOUSING OF THE POOR.

LORD SALISBURY has not rested content with his contribution in the *National Review* to the recent flood of literature on the housing of the poor, but has given notice of his intention to move for a Royal Commission to inquire into the whole subject. The Government will, it is believed, assent to the appointment of the Commission, and will enlarge its powers so as to take in the housing of the poor in rural districts, which is certainly equally important. They will be sanguine who hope for much immediate good from the appointment of such a Commission, though if it succeeds in making permanent the impression on the public mind which recent disclosures have brought about, it will more than justify its creation. What is wanted is not so much information as to how the poor live as more 'motive power,' to borrow the Home Secretary's figure of speech. It cannot be doubted that abundant powers already exist for the repression of such of the evils attending the housing of the poor as are at all preventable. Vice, degradation, and misery would still exist even were every home in the kingdom as sanitarily perfect as it could be made. What the Royal Commission should aim at finding out is the method by which existing laws can be made more prompt and more efficacious, not how the law can be altered and 'strengthened' so as to attempt to make it automatic. Acts of Parliament do not work themselves. They need somebody to keep them in motion. Where, as is the case in the metropolis, powers have been left to rust for seventeen years, it is idle to ask Parliament to forge a new and a keener weapon, only that it may be kept in the scabbard with its older fellow. What the Commission might do with really beneficial results is to probe to the bottom the question of rents: what ground rents are paid by the landlords, what rents are exacted from the helpless tenants, and how far the question of compensation is to be considered in connection with the pulling down of rotten house property. They might also usefully take up the question as to the existing sanitary supervision of such property by local authorities: how far the present staff are adequate for the purpose, how far they have done what they had capacity to do, and how far unwholesome property has been subjected to the ordeal of the police-court. If it be objected that this is looking at things through a microscope, it may be answered that there is no royal road for dealing with the question of artisans' dwellings. It is a many-sided problem, not to be solved by a bold slapdash piece of legislation. If we would understand and master it, we must begin with its lowest depths, and must make ourselves masters of its intimate daily working before we can hopefully generalise about it. The Royal Commission has a painfully interesting task before it, a task not to be escaped by any clamour for fresh legislation, vague suggestions of improved organisation, or demands of money from the public purse. That it may succeed in improving the conditions under which the poor are compelled to live, every philanthropist—indeed, every one with any heart at all—must anxiously desire, but this good object will never be obtained by the mere endorsement of thoughtless demands for more legislation.

IMPROVEMENT OF THE DWELLINGS OF THE POOR.

SIR W. HARCOURT and Sir Charles Dilke, in reply to a deputation which recently waited upon them on this subject, made some important statements which indicate not merely that some provision for the improvement of the dwellings of the poor is to be made in the new Local Government of London Bill, but also shadow forth the lines on which part of the Bill is framed.

Sir Charles Dilke, who spoke first, made allusion to his visits to the poorest districts of London, and stated that he believed, with the exception of the central parishes and of Bermondsey, they are in a much better condition than they were in 1854, but for all that he spoke strongly against the apathy displayed by the vestries as regards Torrens' Acts. He also made the important statement that the Government are pledged to divide the rates between the owners and occupiers of property. This is likely to be useful, as although to a certain extent the rates paid by the owner will be added to the rent, this cannot be done as regards houses now let on lease, so that the sums thus paid will afford some help towards the reconstruction of uninhabitable houses. As regards compensation to occupiers, he expressed no opinion, as this would make the cost of reconstruction more costly. At any rate this and the whole subject of compensation cannot be considered for a year or two.

The point, however, which was most dwelt upon was the necessity of unity of power and action; that is to say, the investing in one central authority of the power to compel action by the vestries, and of assessing the cost on the whole of London. If alterations in the law enabling these things to be done be carried, much of the evil will be abated, as at present it is difficult to say what block of dwellings should be condemned under Torrens' or the other Artisans' Dwellings Acts. Thus the unseemly game of battledore and shuttlecock lately played between certain vestries and the Local Government Board, as regards 'official representations' as to unhealthy dwellings by medical officers of health, will be prevented. In speaking of the necessity for unity of action Sir William Harcourt referred to the address of Dr. Dudfield published in the SANITARY RECORD, which he mentioned as a very useful publication. He also said that this unity could not be obtained through the Government, but in some central body in connection with the local authorities of the metropolis. But he took, we think, far too sanguine a view when he said that in his opinion the evils at present existing as regards the dwellings of the poor are perfectly curable, and 'have arisen from want of unity of authority, and from want of one motive and controlling power.'

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The present condition of the dwellings of the poorest classes has certainly not arisen from these causes, although it has been aggravated by the want of a central controlling power to put the law into action. It is true that the paucity of inspectors and the disinclination of many of the vestries and boards to take such action as would cast the cost of pulling down and rebuilding on the parish or district in which the dwellings are situated have undoubtedly aggravated the evil, but the root is deeper, and is manifold in its ramifications. The chief causes are the great competition amongst the poorest classes for the limited amount of work at their disposal; the low prices at which many articles are now manufactured abroad; the concentration of urban as compared with rural populations; the diminution in the quantity of arable land under cultivation, and the consequent lessened demand for unskilled labour. In addition to these must be added the small sum which most of the 'substratum,' as the poorest of our population have been termed, can pay for rent, and the consequent underletting. The destructive and filthy habits of very many of these classes, and the consequently large cost necessary to keep their houses in repair (an amount which must be added to the rent), the value of the ground in the centre of London—will all prevent rents being reduced to a point that will admit of accommodation being provided for them at such a rental as they can pay. It is therefore evident that whilst a central body with full power to set in action the present laws can only produce some improvement in these dwellings, it is chiefly to better education, as well as to improved habits of these classes, that an ultimate cure is to be hoped for. Rents are undoubtedly in many instances far too high for the accommodation afforded, even after allowing for the great value of the land on which the tenements are built, but these rents cannot be much reduced except by large sums being expended by the metropolitan authorities as a kind of subsidy towards the wants of the poor. The whole matter must be looked at in a broader and more comprehensive manner than it has been by these two Ministers, and it is therefore of some moment that the admission has been made that the President of the Local Government Board and the Secretary of State could not form a small commission to put in force the necessary remedies for the present lamentable state of these dwellings, 'as they are totally unfit to administer duties of this character.' We must therefore wait for the introduction of the Government of London Bill, before we can express any opinion on the particular remedies to be proposed for these pressing evils.

THE Board of Works for the Wandsworth district has received a communication from the solicitors to the Southwark and Vauxhall Water Company, calling upon it to enforce the provisions of Section 81 of the Metropolis Local Management Act, with respect to houses which have been erected or rebuilt since 1855, and which are not at the present time furnished with suitable water supplies and water-supplying apparatus, &c., and calling attention to certain houses to which the company's request more especially relates; also stating that in the event of the board declining to comply with such request within eight days, or intimating that they intend to do so, the solicitors will assume that the Board decline to take the action referred to, in which event their instructions are to take steps to summon the responsible parties at the instance of a common informer.

NOTES OF THE MONTH.

THE PROHIBITION OF TRICHINOUS MEATS.

ALL who are interested in questions of international hygiene will be pleased to have their attention called to a paper on 'Trichinosis and the decrees prohibiting the importation of American salt meats into Europe.' It appears in the first number of a new journal entitled *Revue Sanitaire*, just published at Bordeaux. Dr. Alexander Layet, Professor of Hygiene of the Faculty of Medicine, is the editor of the *Revue*, and this is sufficient guarantee that the paper is a carefully prepared *resumé* of the subject treated of. The reader is thus enabled to contrast the protective system of continental states with the free trade which obtains in our own country. The paper extends over eight columns, and is somewhat too long for reproduction, while it is so compact already that it scarcely admits of condensing. The history of trichinosis may be divided into two periods; the purely scientific period, occupied with the study of the parasite as regards its evolution and development, and the hygienic period devoted to the study of the danger to the public health of employing trichinous meats as human food. The first period commences with the discovery by Hilton of trichinous cysts in the muscles of a man's body undergoing dissection in 1831; and terminates with the discoveries by Zenker, in 1860, concerning the development of trichinæ in animals fed on pork infused with trichinous cysts. Trichinæ were first detected in pork in 1847, by Leidy. The second period commences with the first microscopical examination of pork destined for the public market, and asserts itself by the decrees prohibiting American salt meats, promulgated in many European states. The paper is of course exclusively devoted to the hygiene of trichinosis from American pork, and gives a concise historical account of the preventive measures which have been resorted to in Europe, from the earliest official microscopic examination of pork in Saxony, the first fruits of Zenker's researches, to the recent decree of the French Minister of Commerce, authorising the importation of American salt pork into France. By the way, this last decree, designed to rescind the famous decree of Feb. 18, 1881, is to be in abeyance till the whole subject has been fully discussed by the Chamber of Deputies.

PAST AND PRESENT MORTALITY RECORDS.

PROBABLY one of the best organised and most useful departments of Government is the General Register Office of Births, Deaths, and Marriages, which Major Graham and Dr. Farr brought to so high a degree of accuracy and efficiency. Although a special census Commission is decennially appointed to make a numbering of the people, the work of the census is practically done by the staff of the Registrar-General, who himself, with two of his principal officers, constituted the last Commission. The final report on the census of 1881 has just been issued, and a very interesting document it is. Naturally, each decade helps to make the census machinery more efficient and useful for its purpose; but it would seem difficult to improve upon the Blue-book just published. Even in the ten years which have elapsed since the last numbering was made, great improvements have taken place in medical nomen-

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clature and the like, so that it is now easy, with the census volumes and the Registrar-General's returns before us, to get a fairly accurate idea as to the effect which certain occupations have upon health and life, and the proportion of workers who are killed or damaged by their means of livelihood. Perhaps no one would expect to find records at all comparable to these two centuries back; but the contrast between the old Bills of Mortality and the Registrar-General's present weekly return may fairly astonish even the most bigoted admirers of the golden age of literature. 'Griping in the guts' has, it is true, its counterpart in the more euphonious and less vulgar 'diarrhœa,' and 'overlaid and starved,' 'hanged and made away themselves,' 'spotted fever,' and the like, are still with us. But we have grown out of 'tympany,' 'frighted,' 'rising of the lights'—whatever that may mean—and 'stopping of the stomach.' Perhaps Macaulay's 'New Zealander' will make equally merry over some of our present nomenclature; but he will at least have to admit that, according to her lights, England of the latter half of the nineteenth century has done her best to place on record accurate and reliable particulars as to her living and dying.

THE SPOTTISWOODE MEMORIAL.

AT a meeting held under the presidency of Mr. Warren De La Rue, F.R.S., in the rooms of the Royal Society of Literature, St. Martin's Place, to take steps for raising a public memorial to the late William Spottiswoode, thirty-five gentlemen, including several distinguished in science and literature, were appointed a committee with power to add to their number. Mr. Warren De La Rue accepted the office of chairman of committee, Mr. Samuel Spalding (of the firm of Spalding and Hodge, paper makers) was elected treasurer, and Mr. J. S. Hodson, secretary. It was agreed that the London and Westminster Bank be requested to act as bankers for the memorial fund. Mr. Hodson, F.R.S.L., stated that he had received promises of the subscriptions following:—Messrs. Eyre and Spottiswoode, 52*l.* 10*s.*; Messrs. Spottiswoode & Co., 52*l.* 10*s.*; Mr. Warren De La Rue, Dr. John Evans (treasurer of the Royal Society), Mr. C. Austen Leigh, Mr. J. Esson, and Mr. G. H. Mason, ten guineas each; Mr. Edmund Johnson, Mr. C. J. Clay (Cambridge), the Rev. W. H. Milman, the Rev. R. H. A. Bradley, Mr. F. J. E. Young, and Mr. Noble Taylor, five guineas each; the Rev. C. L. White (Reading) and Mr. Thomas Gray, of the Board of Trade, 5*l.* each; Sir Frederick Evans, three guineas, and several of less amount. It is proposed that the fund shall be administered under the auspices of the Executive of the Printers' Corporation, which, the preliminary prospectus for the memorial states, has, during the half century of its existence, earned for itself a reputation for consistently and successfully providing relief for aged and infirm printers, and of which institution Mr. Spottiswoode was a trustee.

THE DUBLIN ARTISANS' DWELLINGS COMPANY AND THEIR TENANTS.

THE fourth annual distribution of the prizes given by Lord and Lady Brabazon to the wives of tradesmen in occupation of these new tenements, took place on Jan. 4. It was stated that great advance had been made in habits of thrift and tidiness, and that a wholesome influence is spreading amongst those residing in ill-favoured domiciles in the vicinity of the company's improved dwellings. The owner of the best kept cottage was awarded 3*l.* and a neat silver teapot. Out of 532 tenants there were 206 competitors.

BUILDING REGULATIONS IN PARIS.

THE following building regulations have recently been put into force in Paris:—Ridges of all roofs in future buildings must be provided with a horizontal pathway, at least 70 centimètres (2 ft. 3½ in.) wide for the use of workmen, firemen, and inhabitants in case of fire. This pathway to be bordered on one side by railings 30 centimètres (1 ft.) high, on the other by a handrail, at least 80 centimètres (2 ft. 8 in.) high, with sufficient network to prevent accidents. The network may be made ornamental, but the handrail must remain smooth. All partition walls and others perpendicular to façades must be provided behind with iron ladders and handrails fixed on to the masonry, and entirely independent of roofing timber. Double staircases in upper stories must especially be provided for easier flight in case of fire.

POISONOUS WALL-PAPERS AND TEXTILE FABRICS.

EARLY last year, at the instance of Mr. Ernest Hart, chairman of the National Health Society, Lord Granville addressed a circular to her Majesty's representatives at European Courts and Washington requesting information respecting the legislation or municipal enactments in force in foreign countries, having for their object the limitations, restrictions, or safeguards, in the manufacture, use, or sale of arsenical and other poisonous pigments used in tinting wall-papers and textile fabrics. The answers to the circular have now been received, and have been issued as a Parliamentary paper. It appears that the Austrian penal code strictly prohibits the application of mineral colours containing copper, arsenic, lead, zinc, and other poisonous metallic preparations to stuffs destined to come in contact with the human body; in France there are no special regulations on the subject; in Germany the use of poisonous colours for paper-hangings and wearing apparel is forbidden throughout the empire; there seems to be no legislation on the subject in the United States; thirty-three out of the forty-six governors of states and territories stated that there was no State legislation or municipal enactment bearing on the matter.

THE MANSION HOUSE COUNCIL ON THE DWELLINGS OF THE POOR.

TWO committees have been formed from the Mansion House Council on the Dwellings of the Poor—the first, the General Purposes Committee, to deal with rehousing or rebuilding schemes, many of which are before us, and also to watch legislative action and to promote amendments where required. The second, the Central Sanitary Aid Committee, is promoting the formation and affiliation of local committees in East, West, and North Marylebone, North and South St. Pancras, Holloway, Highgate, Hampstead, Islington, Paddington, Westminster,

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Brompton, Putney, the Potteries, Lambeth, Southwark, Bermondsey, Shadwell, Whitechapel, St. George's in the East, Clerkenwell, and St. Luke's. It is proposed to extend these committees until the whole metropolitan area has been covered. To insure uniformity of action and avoid unnecessary clashing, each committee is limited to the working of its own clearly defined area, and rules for the guidance of the members, together with a brief synopsis of the Acts as they apply to the various nuisances and defects of insanitary dwellings, have been prepared and will be supplied gratis. The working expenses of the local committees will be defrayed by the Mansion House Council, and all forms, notices, &c., will be provided free. Each committee will be regularly visited by the executive officer, through whom they will report, month by month, the work done in their respective localities to the Central Committee. Volunteers are invited to place themselves in communication with the hon. secretary, who will be glad, through the executive officer, Dr. Whitelegge, to lend personal aid in opening up new districts. Subscriptions may be sent to the Lord Mayor at the Mansion House.

THE PUBLIC HEALTH

During January 1884.

The mean temperature during the month of January at the Royal Observatory, Greenwich, was as high as 43°·9; it was 7°·6 above the average January temperature in one hundred years, and exceeded that recorded in the corresponding month of any year since 1834, when it was 44°·4. An excess of temperature prevailed on no less than twenty-seven days of the month, while only on four days it was below the average. The warmest day of the month was the 30th, when the mean was so high as 50°·0, and 9°·7 above the average; the coldest day was the 1st, when the mean did not exceed 33°·9, and was 4°·2 below the average. Rain was measured at Greenwich on fifteen days during the month, to the aggregate amount of 1·8 inches, which was slightly below the average January rainfall in sixty-one years. The sun was above the horizon during 259·1 hours during January, but only 16·6 hours of bright sunshine were recorded at Greenwich. This amount was considerably below the average of the corresponding periods of the five years 1879–83. South-westerly winds prevailed throughout the month.

In the twenty-eight large English towns dealt with in the Registrar-General's Weekly Return, which have an estimated population of nearly eight and three-quarter millions of persons, 29,325 births and 17,595 deaths were registered during the five weeks ending the 2nd inst. The birth-rate, which in the three preceding months had declined from 34·1 to 31·7 per 1,000, rose again to 34·9 during January, but was 2·6 below that recorded in the corresponding period of last year. The lowest birth-rates in these twenty-eight towns last month were 26·5 in Halifax, 27·1 in Bradford, and 28·9 in Brighton; in the other towns the rates ranged upwards to 41·0 in Newcastle-upon-Tyne, 41·2 in Nottingham, and 42·6 in Sunderland. In London the birth-rate last month was 34·6, while in the twenty-seven provincial towns it averaged 35·2 per 1,000.

The annual death-rate in the twenty-eight towns, which in the two preceding months had been 22·6 and 21·7, further declined to 21·0 during the five weeks of December, and was considerably below that recorded in these towns in the first month either of 1881 or 1882, when it was 24·0 and 22·7 per 1,000 respectively. The lowest annual rate of mortality in these towns last month was 17·0 in Portsmouth. The rates in the other towns, ranged in order from the lowest, were as follow:—Leicester, 17·7; Derby, 17·9; Bradford, 18·1; Wolverhampton, 18·1; Bristol, 18·2; Hull, 18·3; Norwich, 18·6; Nottingham, 19·8; Blackburn, 19·8; Halifax, 19·8; Plymouth, 19·8; Huddersfield, 20·1; London, 20·4; Birmingham, 20·7; Bolton, 20·8; Birkenhead, 21·0; Preston, 21·3; Liverpool, 21·9; Newcastle-upon-Tyne, 21·9; Sunderland, 22·3; Salford, 22·9; Cardiff, 22·9; Brighton, 23·0; Oldham, 23·4; Sheffield, 23 8; Leeds, 25·1; and the highest rate during the month 27·2 in Manchester. While the death-rate in London during January, as before stated, was 20·4, it averaged 21·4 in the twenty-seven provincial towns. The 17,595 deaths from all causes in the twenty-eight towns during the five weeks of January included 575 which resulted from whooping-cough, 535 from scarlet fever, 477 from measles, 249 from 'fever' (principally enteric), 152 from diphtheria, 135 from diarrhœa, and 77 from small-pox. In all, 2,200, or 12·5 per cent. of the total deaths, were referred to these principal zymotic diseases, equal to an annual rate of 2·6 per 1,000. This zymotic death-rate showed a further slight decline from that recorded in the two preceding months, but somewhat exceeded that which prevailed in the last month of 1883. The death-rate in London during January from the principal zymotic diseases was equal to 2·5 per 1,000, and was slightly below the average rate in the twenty-seven provincial towns, among which it ranged from 0·7 in Halifax, and 0·9 in Norwich, in Bristol, and in Wolverhampton, to 4·2 in Manchester, 4·3 in Salford, and 5·7 in Leeds. Measles caused the high zymotic death-rates in Manchester and Salford, and scarlet fever in Leeds.

Whooping-cough was the most fatal zymotic disease in the twenty-eight large towns during the first month of this year. The rate of mortality from this disease, which had been 0·26, 0·37, and 0·47 in the last three months of 1883, further rose during January to 0·69, which slightly exceeded the rate recorded in the corresponding month of 1883. In London the death-rate from whooping-cough was as much as 0·95 per 1,000; but in the twenty-seven provincial towns it did not average more than 0·46, but was equal to 1·0 in Manchester, 1·3 in Huddersfield, and 1·4 in Bolton. The death-rates from scarlet fever, which in the two preceding months had been 0·84 and 0·71 per 1,000, further declined during January to 0·64; in the corresponding periods of 1882 and 1883 the death-rates from scarlet fever in these towns were 0·65 and 0·53 respectively. No fatal case of this disease was recorded during last month in Plymouth, Bolton, or Huddersfield; in the other towns the rates of mortality from scarlet fever ranged upwards to 1·9 in Sheffield and 3·9 in Leeds. The rate of mortality from measles, which had been 0·28, 0·56, and 0·69 in the three preceding months, declined to 0·57 during January. In London the measles death-rate was 0·54, and was slightly below the average rate in the twenty-seven provincial towns; among which it was equal to 1·6 in Birkenhead, 1·8 in Derby, and 2·0 in Salford. The death-rate from 'fever' (principally enteric) was equal to 0·30 per 1,000, and showed a further decline from the rates recorded in the two previous months, which were 0·46 and 0·37 respectively. The rate of mortality from fever was lower during the month under review than in any month since July last, and lower than that recorded in the corresponding month of either of the two preceding years. In London the fever-rate last month was equal to 0·25 per 1,000, and averaged 0·33 in the provincial towns, among which it was equal to 1·0 in Cardiff and 1·3 in Blackburn. The rate of mortality from diphtheria, which in the five preceding months had steadily increased from 0·15 to 0·21 per 1,000, declined during January to 0·18; this disease continued to be proportionately much more fatal in London than in the provincial towns; it caused, however, 11 deaths in Leeds and 9 in Hull. During the five weeks of January 77 deaths from small-pox were registered in the twenty-eight towns; of these, 28 occurred in Birmingham, 17 in Sunderland, 16 in

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London, 14 in Liverpool, 1 in Manchester, and 1 in Wolverhampton. During the last seven months no fewer than 122 fatal cases of small-pox have been recorded in Birmingham. Judged by the returns of the Metropolitan Asylums Hospitals, the prevalence of small-pox in London showed a further increase; the number of small-pox patients under treatment in these hospitals, which had been 41, 49, and 98 at the end of the three preceding months, further rose to 110 at the end of January, and exceeded the number at any time since August last. The average weekly number of new cases admitted to these hospitals, however, which in the three previous months had been 7, 12, and 23, declined to 18 during January.

The rate of infant mortality in the twenty-eight towns, measured by the proportion of deaths under one year of age to births registered, was equal to 136 per 1,000 during January, which corresponded with the rate in these towns in the first month of 1883. In London the rate of infant mortality was equal to 135, and was slightly below the average rate in the twenty-seven provincial towns, among which it ranged from 84 in Derby, 87 in Portsmouth, and 96 in Wolverhampton, to 158 in Newcastle-on-Tyne, 180 in Huddersfield, and 208 in Brighton.

The death-rate from diseases of the respiratory organs, judged by the metropolitan returns, was below that recorded in the corresponding periods of the two preceding years. The average weekly number of deaths referred to these diseases during January in London was 378, and the annual death-rate was equal to 4·9 per 1,000, against 6·5 and 5·0 in the first months of 1882 and 1883. The annual death-rate from these diseases in Liverpool last month was 4·7 per 1,000.

The causes of 451 of the 17,595 deaths registered in the twenty-eight towns during the five weeks of January were not certified, either by registered medical practitioners or by coroners. These uncertified deaths were equal to 2·6 per cent. of the total deaths, which showed a slight decline from the increasing proportions in recent months. The proportion of uncertified deaths in London did not exceed 1·4 per cent., whereas in the twenty-seven provincial towns it averaged 3·5. All the causes of death were duly certified in Plymouth throughout the month, and only one was uncertified in Derby; whereas the proportion of uncertified deaths was equal to 6·7 in Salford, 8·2 in Hull, and 9·0 in Halifax.

Among the population living in the outer ring of suburban districts around London, estimated at rather more than a million persons, the annual death-rate from all causes during January was equal to 17·1 per 1,000, against 18·8 and 16·5 in the corresponding periods of 1882 and 1883. During the five weeks ending the 2nd inst., 49 fatal cases of whooping-cough, 29 of diphtheria, 28 of scarlet fever, 20 of 'fever,' 18 of measles, 12 of diarrhœa, and 3 of small-pox, were recorded in the outer ring. These 159 deaths were equal to a rate of 1·5 per 1,000, against 1·9 in each of the two preceding months. The fatality of measles, scarlet fever, and fever showed a decline, but the fatal cases of diphtheria and of whooping-cough exceeded those returned in the preceding month. In the district of West Ham, 14 deaths from whooping-cough, 11 from scarlet fever, 7 from measles, 4 from diphtheria, and 3 from small-pox, were recorded during the month. Six fatal cases of diphtheria and 5 of fever occurred in Edmonton district.

THE corporation of Bath have voted the sum of 500*l.* towards the expenses of a model of the ancient and modern baths, to be placed in the International Health Exhibition to be held at South Kensington this year. These baths have now regained their former pre-eminence.

THE report of the Sanitas Company, Limited, shows an available balance, after deduction of interim dividend, &c., of 1,816*l.* From this a dividend of 7½ per cent. is recommended, making 10 per cent. for the year, and leaving 91*l.* to be carried forward.

SPECIAL REPORTS.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

AT a meeting of this Society, held at 1 Adam Street, Adelphi, on Friday, Jan. 18, 1884, the president, Dr. T. O. Dudfield, in the chair, Dr. W. G. Walford, late medical officer of health to King's Lynn, and Mr. S. M. W. Wilson, medical officer of health to King's Lynn Borough and Port, were elected members of the society.

Mr. Wynter Blyth demonstrated to the society a new test which he had discovered for the presence of lead in drinking-waters. A few drops of an alcoholic tincture of cochineal, added to water containing a trace of lead, strikes a blue instead of a red. One part of lead in 70,000 of water gives a very distinct reaction, and it is possible to detect by these means one part of lead in two millions. All soluble salts of lead give the same reaction. Copper gives a somewhat similar colour, but not identical. The water must be neutral or alkaline for the test to succeed.

Dr. Corner related the history of two cases of lead-poisoning resulting from working in lead factories. One had died in Guy's Hospital and one in the London Hospital. All precautions had been taken to prevent such an accident, but these cases had occurred notwithstanding.

Dr. Bate referred to the precautions taken in Bethnal Green for the prevention of death from lead-poisoning.

Dr. Walford read a paper, of which the following is an abstract, entitled 'A NINE YEARS' STEWARDSHIP AS MEDICAL OFFICER OF HEALTH AT KING'S LYNN; ITS DIFFICULTIES, AND THE RESULTS, ESPECIALLY WITH REFERENCE TO THE IMPROVEMENT OF THE DWELLINGS OF THE POOR.' He said that when he took office in 1873 the population of the town was about 17,000, and that the Corporation allowed a fee of two shillings and sixpence to the parish medical officers for every report made to him of cases of infectious disease or any other matter requiring his attention; that through the ladies of the district visiting society, the police, the assistance of brother medical men, and in various other ways, he also received much valuable information, so that it could very rarely happen that anything demanding his attention could escape notice. Accompanied by the borough surveyor, he also made regular inspections of his district at frequent intervals.

Lynn bears much similarity to other large towns of this country in having the same vices, the same wretched slums, squalid misery, poverty, and overcrowding, and a year or so before Dr. Walford took office, there was in Lynn a somewhat similar agitation to that in London now concerning the dwellings and sanitary condition of the poor. Dr. Walford found that his sanitary authority was always ready to enforce the various Acts relating to the housing of the poor, such as have not generally been made use of. He also soon found that he had two classes of the poor to deal with, those who would help themselves and those who would not. The former took every advantage of improvements, and, being naturally more thrifty and able to pay a better rent than their improvident neighbours, would try in every way to raise themselves. With regard to the other class, all improvements of every kind were completely thrown away upon them. Dr. Walford remembered instances in which such people, having a good house to start with, or a dilapidated house thoroughly repaired, very soon wrecked it by putting every piece of wood they could detach into the fire, and they more often than not paid no rent. As Lynn was a manufacturing seaport town, there was always plenty of work, and rents were low, so that the wretched condition in which the poor lived was mainly, if not entirely, due to their own improvidence. With regard to overcrowding, with a large number of the poor it was merely a matter of wages in proportion to rent; given, therefore, a poor man with a large family, out of regular work, or in indifferent health, he could only obtain such accommodation as his wages

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would afford, which was often certainly insufficient for sanitary purposes; but still he could not be compelled to go into the workhouse; no one could drive him into the street or give him a better house, and the only thing to do was to leave him where he was. As to overcrowding from the introduction of lodgers into a house or room, it was most difficult, if not impossible, to find out how many would come in at night for a shakedown, and though a suspicious tenant might sometimes be ejected by the landlord, the result was probably only to produce overcrowding elsewhere. As a result Dr. Walford considers that the existing Acts are sufficient to deal with the matter as far as it can be dealt with, that very great improvement during his term of office was made in the dwellings of the better class of poor, while as to the others, after years of work, he was obliged to confess that very little, if any, improvement was effected, and he thought that nothing could be done until they got a policeman to stand at the door of each hovel to look after the behaviour of its inmates, and to see that no one entered after the registered number of occupants had passed in. Dr. Walford also spoke of the results of notification of infectious diseases. When he began his duties, shortly after a severe epidemic of scarlet fever, he found people willing to adopt every sanitary precaution, so that for some years the disease was hardly known in Lynn, but after seven or eight years this very immunity from the disease engendered such an indifference to it that he had much greater difficulty in enforcing the proper measures, and as a result the mortality was high.

Dr. Dudfield, in opening the discussion, referred in complimentary terms to the system described in Dr. Walford's paper for obtaining information concerning cases of infectious disease. He thought all poor-law medical officers should be paid for certificates, and said that in Kensington 3*s.* 6*d.* was paid for certificates relating to those persons who were not paupers. Referring to the recent outcry against landlords, he admitted he felt some sympathy for them, for the destructive habits of the tenants compelled the landlord to charge high rents, but a small portion of which reached the pockets of the landlords. Overcrowding was the greatest difficulty to be overcome. There was simply a choice of allowing the people to remain where they were or of compelling them to go into the workhouse or the street. With such an alternative he preferred the first.

Mr. Wynter Blyth thought that sufficient allowance was not made for the peculiarities of race. Under any circumstances the Irish would have the greatest tendency to a high death-rate. He noted, for instance, that when typhus broke out in a town, it was always in the Irish quarter. Age also must be taken into consideration in estimating death-rates. Given the ages of members of the community, he would, for instance, predicate the amount of cancer which would be found in it. He, too, thought much might be said on behalf of landlords. He was of opinion that Torrens's Act might be too freely applied, and would then lead to difficulties.

Mr. Moore urged that artisans in certain trades must live near their work, and related the case of a manager who refused to employ men living more than a mile from their work. The great hindrance to local improvement was the expense to which a district was put; if the cost of improvements fell upon a common fund this difficulty would be removed.

Dr. Armistead elicited from the author that King's Lynn had sewers and a proper water-supply at first, but latterly the water which was taken from the river was liable to pollution from the building of new houses. Also that the situation of the town exposed it to dampness from surface water. He inquired whether the female population suffered from phthisis; the males would of course be away fishing and would not be similarly exposed.

Dr. Dixon asked whether the houses were one or two storeys, and whether the inhabitants slept on the ground floor, a point of importance to the death-rate from phthisis.

Dr. Corner dwelt upon the overcrowded condition of houses in his district; these houses had formerly been occupied by good families, but now a family lived in every room; he believed if regulations for tenement houses had been in force they would have been much improved. During the last six weeks the attempt had been made of lending zinc pails for the reception of house refuse; the inhabitants were instructed to burn vegetable matter, and to place in the pails dry refuse only. The dust was collected twice a week, the pails being put outside the house; the dustmen were prohibited from levying black mail; it was now proposed to put up a destructor.

Mr. Lovett spoke of the improvement which had taken place in London in his time, but regretted that sufficient provision had not been made for those who were displaced by the demolition of houses.

Dr. Waterworth believed that there was gross exaggeration in many statements that had been made with reference to the condition of house property; visits had been made in company with detectives by those persons who believed such protection to be necessary, giving evidence of their ignorance of the locality. He argued that the destruction of houses would not relieve overcrowding.

Dr. Walford briefly replied, and stated that phthisis and bronchitis were prevalent, while cancer and infectious diseases were rare in King's Lynn. The houses were of two storeys, the bedroom being above. The walls were damp in all classes of houses.

THE HEATING OF OUR HOUSES.

A LECTURE on the above subject has been delivered by Mr. E. J. Powell, of the National Health Society, at St. John's School-rooms, East Dulwich; the Rev. T. Acton Warburton in the chair.

The lecturer said that the subject was one that he considered had been very much neglected by the great mass of the people in this country; but there were unmistakable signs that it was beginning to be better understood, and that more interest was being taken in the question. He considered this to be due in a great measure to the late Smoke Abatement Exhibition, which, although inaugurated for the purpose of endeavouring to rid us of that great nuisance, had also introduced us to improved grates and modes of heating, and so had drawn public attention to the matter. He said there has been a vast amount of sentiment thrown around the English fireplace; but, robbed of this sentiment, what does this appliance amount to—simply a means for providing that warmth to our bodies that Nature requires when the mercury in the thermometer has fallen below a certain height. We have arrived at a high state of civilisation, and our architects, builders, and manufacturers of heating appliances are, upon the whole, intelligent and practical men; yet for centuries we have carried out a system of heating our homes, at once the most wasteful, the most ineffectual, and consequently the most costly, that could have been adopted.

But why is it we do not crave for our fire in the summer time? Simply because we are warm enough without it. But immediately one of the cold evenings that we sometimes get in summer or early autumn arrives, we then look at the fireplace and feel a desire to tear away its decorations and have a fire at once. Again, what about those warm evenings in winter, when sitting-rooms feel insufferably hot, and the remark is made, 'Oh, we really must let the fire go out;' and the fire is allowed to go out, and we sit with that delightful picture before us of a fireplace containing ashes and charred coal or cinders.

The lecturer continued: To me all this points a moral, and the moral is that so long as our bodies are sufficiently warm, we care little whether we have an open fire or no fire at all.

But if I condemn our existing arrangements, what do I propose in their place. Whatever my own opinions may be, it is of no use my recommending anything that it is impossible to carry out. The great majority of us are

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tenants, not owners of houses, and we have to take them as they are built, and a system that has existed for centuries must be slow in its exodus, but nevertheless it is doomed to great changes in time. The best thing I can do is to show how the present mode of heating can be improved. And here I may remark that my principal object is to approach this subject from a 'health' point of view. Therefore I want to show that according to our existing arrangements, some further mode of heating houses is absolutely necessary for health's sake. True, it may be said that this has been done to some extent for many years past; but, if we inquire into it, we shall find that, broadly speaking, it has been by a system of hot-water heating, that has been confined to the homes of the wealthy. But this mode of heating cannot be indulged in by the great mass of the community. We are beginning to understand, that as our houses are at present constructed, without the addition of some other mode of heating them, we are living during the winter months in habitations little better, in severe weather, than ice-houses; and if we consider the indifferent manner in which thousands of them are built through the agency of the speculative builder, this fact becomes more apparent. We have certainly improved upon the lines of our forefathers in making our rooms more lofty and airy, but this improvement, which is advantageous in summer, is too often a source of great discomfort in winter, without the supplementary modes of heating, to which I am about to allude. We have, by the facilities accorded us of intercommunication and travel of the present day, become better acquainted with the mode of heating dwellings adopted in those countries where the thermometer falls during the winter months, and is maintained for a long period at a low standard, and of which we now and then get a taste for a short time, sufficiently long, however, to show us that with our present arrangements we are not prepared to combat the advances of a severe frost. Again, from our insular position we are constantly subjected to a considerable amount of a damp and murky atmosphere that has, perhaps, more injurious effects upon the constitution than extreme cold has upon many. But it is necessary to guard against both. I take it that the majority of you are aware of the mode of heating houses in most of the cold climates, but as we in England do not expect to be subjected to such a continuity of rigorous weather, it is not necessary to adopt these plans in their entirety; nevertheless, a modification of the system may well be carried out here with advantages to health and general comfort, and at a comparatively small cost; whilst we may, by the means I propose, materially assist in diminishing the smoke nuisance. In advocating this question, we have to look at it, in a sense, partially. The houses of the wealthy we may exclude entirely, as they are, and always will be, well provided for; it is to the great mass of the middle classes, and those immediately below them in the social scale, these remarks more particularly apply. The very poor we cannot, I fear, take into consideration, so long as they continue to live in the wretched hovels they now do. I trust, however, the day is not far distant when a better class of home will be provided for them, and that a system of heating will be arranged in connection with the building of the houses themselves, which, independent of any fires the inmates may themselves provide, will secure them a moderate amount of warmth at least, if they are not able to obtain it through want of means. At the present time what do we find? Take, for example, the ordinary house of two or three storeys high with basement, a class of residence of which thousands exist in the metropolis. In the basement are the kitchens and a breakfast-parlour. These, we may assume, are moderately warmed by the fires constantly kept up in them, and we then ascend to the ground floor, on a level with the principal entrance. Here we find the dining and drawing-rooms. There is the hall or passage, and the front door, which, in all probability, emits a large amount of draught into the house. It most likely contains two large panes of glass in it, and a large glass fanlight overhead. We proceed to the next floor, which contains, say, two best bedrooms, dressing-room, and probably a bathroom. A floor higher we find more bedrooms, and above that are one or two attics, and most likely a cistern-room, communicating with the roof, and reducing the atmosphere around it by several degrees. The fire in the dining-room is not lit, perhaps, until nearly midday; that in the drawing-room, except in the case of visitors being expected, is perhaps brought into requisition only a portion of the week. Ascending to the first floor bedrooms we find that, unless in the case of illness, or the inmates of the house coming home late from entertainments or parties, a fire is rarely indulged in. Going on to the next floor, should there be a young family, and consequently a nursery, we shall find a fire, but should the inmates have passed beyond that stage, as a rule a fire is scarcely ever seen in these bedrooms, the exception being at long intervals, to accomplish what is called airing the rooms, and the same remarks apply to the attics, the coldest part of all. Broadly speaking, then, the house, from the hall or ground floor, is dependent for its warmth upon two or three fires and one or two gaslights on that floor (presuming gas to be used). Now, I will ask you, does that appear a natural way of living, or one calculated to keep the human body in a proper state of health. Even admitting that fires are often lit in the bedrooms, they, as a rule, go out early in the night, and during the coldest part of the twenty-four hours, when the body requires the greatest warmth, we are without one, and we leave our warm beds in the morning shivering with cold. We sit in our sitting-room before a good fire, perhaps with two or three gas burners alight for some hours, become thoroughly warmed, then leave it for a cold, draughty hall, and probably as cold a bedroom, at a time when the body requires more warmth than at any time of the day. Dr. Richardson, at the congress of the Sanitary Institute at Croydon, said that every effort should be made to maintain an equal temperature in the house, that of 60° F. being the best. It is impossible to do this with merely the open grates in our rooms. Let anyone who occupies a moderate-sized house place a thermometer in each room and passage, and he will then learn the different temperatures he is exposed to in passing through that house. There can be neither comfort nor health in a house where a proper equal temperature is not kept up, and the want of this in our houses is doubtless the cause of a very large majority of the pulmonary, bronchial, and rheumatic diseases so prevalent in England.

As an illustration of the difference of temperature in a moderate-sized room well lit with gas and a good fire, let an all-glass thermometer be hung directly against the window, and another against the wall near to it, and a difference will soon be found between the two of several degrees on a moderately cold night. If this is the case in a room under the conditions I have named, how much more cold must it be without additional warmth provided by gas. Now, how is this to be remedied, and in such a manner that it shall come within the means of the classes I have named to adopt? Even if fires were lit in every room in the house we should not attain the desired temperature even if they were kept in night and day.

To obtain an even temperature, or a degree of heat akin to it, a supplementary apparatus must be placed in the lower part of the house and kept alight day and night during the winter months. The next question is, what is the best sort of appliance to adopt, and what will be the probable cost of working it?

In the first place, the stove itself should be adapted to the size of the house, and, in the case of houses having large landings, or being unusually draughty, it may be advisable to have a small one on the ground and first floors, in preference to a large one only on the ground floor. And here I will read you an extract from a work written by Sir H. Hussey Vivian, M.P. for Swansea, called 'A Tour in America in 1877.'

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'Hamilton at the western end of Lake Ontario possesses two special manufactures, "stoves and sewing machines." The manufacture of stoves is of much importance in this rigorous climate. Great improvements have been made, and they are well worthy our attention in England, and especially in north-west Glamorgan.

'The essential feature of the Hamilton stove is that it is a self-feeder, depending on anthracite for its success. It is lighted in the autumn and put out in the spring, burns but little coal, gives but little trouble, and throws out a great and uniform heat. I believe that much economy would result from the use of these stoves, especially if placed in the passages and entrances of our houses, the pipes being carried through the living rooms into the chimneys. My hostess, a most sensible Lancashire lady, long resident at Brecon, which she only left two years ago, is loud in her praises of Canadian stoves—perfect comfort in winter, and no heavy coal bills, instead of just the reverse in the old country. If we wish to enjoy that special pleasure of the Englishman, poking the fire, and to preserve the health undoubtedly due to the ventilation produced by our open fireplaces, we may still do so; but there is no reason why we should not be warm, or why those who cannot afford to waste coal should for ever go on doing so. We possess the finest anthracite in the world, and it is almost unworked. It would be well if our anthracite coal proprietors would push the Canadian stove, and if any desire to do so I shall be glad to show them those I have ordered, which I hope to have in full blast before Christmas.'

The stove to which Sir H. H. Vivian alludes is of the type of the one called the Crown Jewel, which may be obtained through any ironmonger, the agent being Mr. H. Hunt, Newington Green Road.

The lecturer went on to say: This is a self-feeder, holding sufficient fuel to last for twelve or even twenty-four hours, burning anthracite coal or coke. Although a close stove, it is surrounded by mica panels, through which the fire can always be seen, and the most perfect control can be exercised over it. I happen to have some knowledge of these stoves, from the fact that two of my friends have adopted them, and with the best results. It was also exhibited at the Smoke Abatement Exhibition, and there tested, giving most satisfactory results.

But there are other stoves of English make that may no doubt be used with equally satisfactory results. I merely mention this one as a typical stove, because I am well acquainted with it, and because from its performances at South Kensington there is an official information attached to it. Such a stove requires an opening to be made in the wall and a smoke pipe carried outside, or to be run into a chimney, and may perhaps be difficult to fix except in a detached or semi-detached house. I am certainly surprised to find that in most of the modern built houses, unless they are complete mansions, no chimney or arrangement for a stove of this character is made by the architect, an oversight that I think requires remedy. There is also another most convenient agent at command for this purpose, and that is gas, and this will come in where difficulty exists in fixing a coal stove. It is not every gas-stove that I would recommend to be used night and day unless the products of combustion could be carried off, but the two stoves I am about to mention I can recommend with the greatest confidence, and for similar reasons to those I have given in the case of the Crown Jewel stove. The first of these is Cox's ventilating and warm-air-producing gas stove, made by Beynon & Cox, Torquay. This was exhibited at South Kensing-

ton, where it received the highest award given to any stove of its kind, and is now in very general use. A small iron pipe must be brought from the outer atmosphere and attached to a nozzle in the stove made to receive it, and by this means fresh air is brought in, carried up the stove through a series of small pipes fixed into the heating chamber and admitted into the house through the perforated openings in the top. The gas, which is supplied by two or four small fish-tail or ordinary burners, is burnt in a chamber that becomes intensely heated in a very short time, and is by this means burnt at a very high temperature. The heat is carried to a chamber in the upper part, where it is superheated, and the products of combustion rendered comparatively inert, and before any can escape they have to travel down a small pipe at the back to the lower part of the stove, where what remains are admitted into the house, I may say, in a perfectly harmless condition. With the four burners alight this stove will discharge 5,000 cubic feet of fresh warm air into the house per hour; consequently the atmosphere is constantly being changed, and a most agreeable temperature attained. All sanitarians know the value of a ventilating stove or grate, and recommend them in preference to all others. The other gas stove I have here is Clark's Syphon Stove, made by the Hygienic Heating Company, Park Street, Islington. There has been a similar one made for some time, but it must not be confounded with this, which contains an important improvement, in having an additional pipe at the back, to cause the heat and products of combustion to travel over an increased area before they escape. This stove provides both light and heat, and the products of combustion are condensed and escape in the form of water from a small pipe at the bottom into a receptacle provided for it, and there is high authority for the statement that at the most but a small quantity of carbonic acid gas escapes which scarcely affects the atmosphere at all. Further, we have the authority of the

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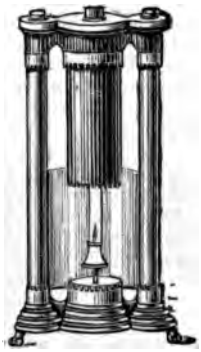
ninent horticulturists, Messrs. Veitch & Sons, who have it this stove to most crucial tests with the most delicate



ants, that it may be used with the greatest safety in nservatories, and the firm, I believe, recommend them ·ongly to their customers.

There is yet another class of stove and fuel equally icacious for carrying out the objects I am recommending, d that is mineral oil stoves. Here are two in action—single and double burner stove—made of fire-clay, glazed the outside in colours, and, by means of coloured ass in the front, presenting, a very nice effect. They

e the invention of the Silber Light Company, of 'hitecross Street, and from experiments recently made ith them, I am bound to say their heating powers ve somewhat surprised me; and, as they require no ing whatever, and stand upon a wooden base running on stors, they can be readily wheeled to any part in which creased heat is required.

The experiments to which I allude showed that both of ese stoves will attain their maximum heating power in ie and a half hours from the time of first lighting. With e atmosphere of the room at 58°, the single burner stove as lit at 10·30 A.M., and at twelve o'clock the thermo-eter, which was suspended in the centre of the room, five et from the floor, and the same distance from the stove, gistered 73½°, at which figure it was maintained until the ht was extinguished, showing an increase of temperature 15½°. Similar results were obtained in the case of the uble burner stove, the atmosphere being 58° at the com-encement, which was raised to 89° in one and a half urs, at which it was maintained, the difference here being a rise of 31°, or exactly double that of the single burner. The approximate quantity of oil burned was one pint per burner in six hours, making them amongst the most economical of heat-producing stoves extant. Now, any of the stoves I have mentioned will enable people to heat their houses comfortably and effectually while using open fireplaces in dwelling-rooms, and they remain the property of the purchaser whenever he leaves the house, the only necessity being to replace a brick in the wall where the pipe has been carried through.

We will now consider how we can improve our open fireplaces without proceeding to any radical change. The usual plan of recessing the grate in the chimney breast is the most insane that can be adopted. In the tests taken at the Smoke Abatement Exhibition it was shown that 43 per cent. of the heat obtainable from coal fuel was expended up the chimney; this was the result from the most approved grates that were brought together there, and there is no doubt that in many grates of less scientific construction a still greater amount is lost. Now, if we reverse our grates, and project them into the room on the principle of the Wharncliffe Grate, of Messrs. Steel & Garland, of the Holborn Viaduct, we not only obtain more heat with less fuel, but we obtain the advantage of a ventilating grate. This is constructed to bring in fresh air from the

outside, which is warmed in the projecting canopy, and admitted through the openings into the apartment. Any one who has not used a ventilating-grate of this class can scarcely conceive the comfort derivable from it in the improved atmosphere of the room and in the diffusion of heat more uniformly over it. A saving of at least half the fuel is effected by their use, and the production of smoke consequently reduced in the same ratio. There are other makers of a similar class of grates besides the firm I have mentioned, but I think they may be introduced in a cheaper form than they are at present, and so enable them to be fixed in a cheaper class of house, which would be most desirable. Another form in which the heat that escapes from our fireplaces up the chimney may be collected or utilised is by forming a hot-air chamber behind the back of the grate, and attaching a pipe or pipes from it, and carrying them up the chimney to the next floor, where, by means of a

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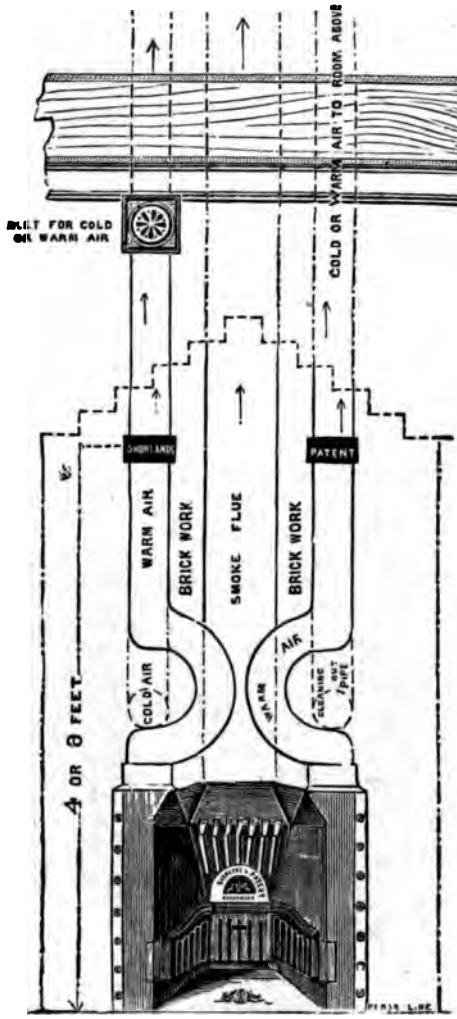
ventilator fixed in the wall of the room the heated air is admitted to it, and is sufficiently warm to heat any apartment in which it is introduced. The Manchester grate of Messrs. Shorland, Erskine Street, Manchester, of which a diagram is presented, is of this character. It was tested



at the Manchester Smoke Abatement Exhibition with most satisfactory results, and was awarded the highest prize. These grates are largely in use, and have given much satisfaction whenever fixed. I will not trespass upon your time longer, though I have by no means exhausted my subject. While desirous to improve the heating arrangements of sitting-rooms, I am the more impressed with the necessity of heating houses in the manner described; and if the means I have suggested be adopted, I am satisfied that not only gain in general comfort will be increased, but that the health of both adults and children will be materially improved.

INTERNATIONAL HEALTH EXHIBITION, LONDON, 1884.

THE Sub-Committee on Water Supply and Sanitation have prepared a memorandum on the exhibits which are sought for Classes 21, 22, 23, and 27 of Group 3, 'The Dwelling' (see SANITARY RECORD, Dec. 15, 1883, p. 319). With a view to bringing before the public examples not only of thoroughly good sanitary arrangements, but also of the defects existing in ordinary houses, the Committee have, with the sanction of the Executive Council, undertaken to supervise the erection of two model dwellings in the grounds of the exhibition, one of which will show, as far as can be done on the limited scale, a house with good sanitary arrangements, while the other will show the usual defects. In the latter case no attempt will be made to exaggerate the ordinary conditions; but the object will be to reproduce accurately a state of things unfortunately too common. Besides these typical illustrations the Committee will be glad to receive from manufacturers whatever examples they may think proper to submit for exhibition of the articles indicated by the classification. It is to be borne in mind that in all cases the exhibits must have a distinct bearing upon health, and that architecture or building construction generally is outside the scope of the exhibition. The exigencies of space will not permit the Executive of the exhibition to invite contributions illustrative of schemes for drainage, water supply, &c., applicable to towns or large districts, and it is therefore to be understood that the exhibits must be confined to domestic sanitation alone. The Committee would impress upon exhibitors the desirability of, as far as possible, exhibiting their own manufactures only, not those of other makers; and also of restricting their exhibits to typical examples of their appliances, and of not sending more than a single example of each article. Indeed, the Committee cannot undertake to find space for things which are substantially duplicates of one another. As the exhibition will be a place of popular resort, and is intended for the instruction of the general public rather than specialists, it will be desirable that exhibitors of sanitary wares should assist the Committee in making such arrangements as will bring the articles which it is necessary to show before the notice of the public in a manner as agreeable as possible. It will, of course, be necessary to show examples of closets, urinals, &c., but these should be so arranged that while it may be possible for anybody desiring to inspect their action to have full opportunity of doing so, they yet will not attract general attention in an undesirable manner.

A memorandum prepared by the Sub-Committee on the Construction and Fittings of the Dwelling-house has just been issued. The committee think it should be distinctly understood, with regard to all the classes in which are to be shown buildings, furniture, fittings, &c., that only such exhibits as have a distinct bearing upon health can be admitted. Specimens, therefore, illustrating building construction generally, the decoration of houses, or their furniture, cannot be admitted unless they are shown to have actual reference to the health of the inmates of the houses. It is desired that exhibitors should show, as far as possible, their own manufactures only, and not those of other makers, and they should restrict their exhibits to typical examples of their appliances, not sending more than a single example of each article. It is desired to show not only models and designs for sanitary houses, but also, so far as possible, specimens showing their construction. It is desirable that those exhibitors who are prepared to erect specimens of actual buildings should as far as possible co-operate with other exhibitors who may be desirous of showing fittings or furniture for such buildings. The Executive will as far as possible facilitate such arrangements; but it will be well that the exhibitors should agree between themselves as to the manner in which such collective exhibits may be arranged. Under the proper class may be included, in order to draw attention to existing defects, specimens of insanitary decoration—such as arsenical wall-papers, hangings, &c., so that the public may be taught what to avoid. Special interest would attach to any evidence of equally good effects being obtained by the use of harmless materials; and in many cases it may be desirable to show side by side, for purposes of comparison, papers, fabrics, &c., treated with poisonous colouring matters, and also with colouring matter of a harmless character. One of the classes in-

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cludes all appliances for personal cleanliness, public and private baths, &c. It is hoped that a full display of these may be forthcoming. The Executive Council have had under consideration the question of fitting up baths for actual use in the Exhibition, as was done in the Berlin Exhibition, but it has been decided that it would be sufficient to show baths completely fitted without putting them into action.

The Sub-committee on Dress have prepared a memorandum showing the class of exhibits which is desired for that group. The classification includes collections illustrative of the history of dress, rational costume, &c.; waterproof clothing, India-rubber, gutta-percha, &c.; dresses for extreme climates, &c.; dress for sport, hunting suits, &c.; life-saving dress, divers' dress, fireproof dress, &c. There is also a special class devoted to the comparative value of different dress materials for articles of clothing. Under it should be displayed a number of illustrative specimens to show the comparative value of different dress fabrics with reference to their warmth, their hygroscopic properties, the influence of the colour of materials in modifying the effects of sun-heat, and the like. It would be well to show under this class models and drawings illustrative of the effects of poisonous dyes (in clothing) upon the skin. Materials dyed with poisonous and non-poisonous dyes could be placed together for purposes of comparison. The sub-committee are prepared to arrange for a special display of materials and garments, &c., worn next to the skin. Some of these will be shown in a special annexe, to which females alone will have access, or which will, at least, not be open to both sexes at one time. As one special feature in such an exhibition, the sub-committee would suggest a series of models displaying the first clothing of infants as adopted in the various countries in the world, as far as such examples could be obtained. Special attention will be given to dresses suitable for women engaging in exercise, such as dresses for mountaineering, for the moors, for swimming, for horse exercise, for gymnastics, and the like. Under the class devoted to life-saving dress, &c., should be actually demonstrated the value of certain substances used for making muslin and like fabrics non-inflammable. The various artificial starches made for this purpose should be displayed, and their use and effect demonstrated. The dress of female operatives engaged among machinery may be dealt with in this class, also special dresses recommended or in use in factories and occupations of special character—*e.g.* dresses for lead and other factories, dresses of nurses and sick attendants, of soldiers and sailors, life-saving dresses, firemen's dresses.

Class 18.—Under this class will be exhibited dress injurious to health, casts of feet deformed by boots, &c., spinal and thoracic deformities ascribed to tight-lacing, models to show the position of the viscera displaced by such practices and the like.

Class 19.—The sub-committee would suggest the following under this heading:—Machine *versus* hand-weaving, glove-making by machinery, lace-making illustrated by operatives from Honiton, Nottingham, Brussels, &c., the making of hats, the making of boots and shoes, and of lasts for the same, the dressing of furs and certain skins, sewing and knitting machines, &c. (in limited number), the manufacture of waterproof fabrics, the making of crape and some special fabrics, the application of jute to the manufacture of dress fabrics, imitation fabrics.

Memorandum from the Sub-Committee on "Ambulance."

The following heads indicate the artieles and appliances which the Committee are anxious may be shown by the Army Medical Departments of various countries, the societies established to render aid to the sick and wounded in war, and other organisations which may be able and willing to contribute.

1. Personal surgical equipment as carried by the medical officers of the army in question.

2. Appliances for treatment of wounds carried by the soldier himself in the field.

3. Personal surgical equipment carried by ambulance attendants in the field, consisting of surgical haversacks (*haversacs sanitaires*), medical panniers (*caisses sanitaires*), surgical knapsacks, field companions.

4. Ambulance appliances carried by men, such as stretchers (*brancards*), hammocks, dhoolies, and palanquins.

5. Wheeled conveyances wheeled by men—wheeled stretchers.

6. Ambulance equipment carried by mules, horses, &c. Cacolets, litières, mountain ambulance equipment (*ambulance de montagne*), cooking equipment for mountain campaigns—portable medicine chests, compressed drugs, &c.

7. Wheeled vehicles used for the conveyance of sick, fourgons containing the equipment of hospital corps, surgery waggons, equipment waggons, field cooking waggons, pharmacy waggons, nursing utensils carried in waggons of field hospital. Books of instruction for use, diagrams.

8. Railway ambulances, consisting of carriages for wounded, with fittings, cooking carriages, and all the equipment of ambulance trains. Materials for converting ordinary carriages into ambulance carriages.

9. It would be useful if some attendants accustomed to the use of the *matériel* accompanied the articles.

The articles will be arranged in accordance with the following classification:—

Group IIIa.—Ambulance.

Class 31a.—Aid to sick and wounded in war. Transport—(*a*) By human agency; stretchers, litters, dhoolies, palanquins, handcarts, stretchers on wheels. (*b*) By animal traction; mule litters and chairs, camel and elephant litters, wheel carriages. (*c*) By mechanical means; railway ambulances, ship or water carriage. Treatment (with portable appliances and portable drugs). (*a*) On the field. (*b*) In hut hospitals. (*c*) In tent hospitals.

Class 31b.—Aid to sick and injured in peace. Transport—(*a*) By human agency; stretchers, litters, dhoolies, palanquins, hand-carts. (*b*) By animal traction; for accidents and injuries, for infectious diseases, for ordinary sickness. (*c*) By mechanical means; railway carriages for sick and invalids, water carriage. Treatment (with appliances). (*a*) Hut hospitals for infectious fevers and for epidemic diseases. (*b*) In tent hospitals. (*c*) In hospital ships. (*d*) In sick rooms.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

The usually monthly meeting of the above association was held on the 2nd inst. at the rooms of the Social Science Association, 1 Adam Street, Adelphi, the president, Edwin Chadwick, Esq., C.B., in the chair. Lewis Angell, Esq., C.E., was proposed as an honorary member, and ninety-one new members were proposed. In the discussion adjourned from last meeting on Mr. Buckworth's paper, the president, Mr. E. C. Robins, F.S.A.; Messrs. Jerram, Sherbourne, Butler, Rams, Alexander Hare, Edwards, and Middlewick took part

Mr. Legg, the hon. sec., announced that the number of members now amounted to 158. Mr. F. T. Poulson read a paper on 'Procedure in dealing with nuisances.' The discussion on both papers was adjourned till the next meeting on Saturday, March 1, when Mr. T. Rees, of Guildford Union, will read a paper on 'The Public Health Act (1875), from a rural inspector's point of view.'

THE PARKES MUSEUM.

Captain Douglas Galton, C.B., F.R.S., presided at the opening of the spring session at the Parkes Museum on Thursday, January 31, when Mr. H. A. Darbishire,

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F.R.I.B.A., read a paper on 'Artisans' and Labourers' Dwellings,' in which he described in detail the blocks of dwellings erected by the Peabody trustees, which, he urged, were admirably suited to the requirements of the industrial classes who desired to reside in the centre of London or other large towns.

Sir Curtis M. Lampson, one of the Peabody trustees, speaking in the discussion which followed, instanced the rent-roll of the Peabody Buildings as showing that they were meeting the requirements of a large section of the labouring classes of London, who alone were admitted as tenants. The annual report for last year showed that the rents amounted to no less than 1,000*l.* a week, or 52,000*l.* a year. Sir Curtis referred to the large areas in the centre of the metropolis which were covered with miserable two-storey dwellings, and he said that in his opinion it ought to be illegal to erect these small houses in the centre of London. The trustees did not pretend to house the very poor, and he felt sure this would not be done properly without the intervention of Government.

Mr. Mark H. Judge, A.R.I.B.A., one of the directors of the Artisans', Labourers', and General Dwellings Company, said that while admitting that buildings on the Peabody plan had done much to improve the condition of the workers of London, he was persuaded that the solution of the overcrowding difficulty would not be reached until the workmen were able to follow their employers by migrating to the suburbs. One of the most needed reforms was frequent and cheap means of transit between the suburbs and the centre of the metropolis. The Artisans' Dwellings Company had demonstrated the soundness of this conclusion. The company was now the largest owner of cottage dwellings in the world, its rent-roll being upwards of 1,500*l.* a week, or half as much again as that of the Peabody trustees. The Artisans Company, however, could not claim to have reached the very poor; for large as the rent-roll was, the loss by arrears of rent in 1883 was under 200*l.* As to Government interference, Mr. Judge maintained that the local affairs of London were no more the concern of the Legislature than were the local affairs of Liverpool. London was suffering from want of proper local government; and all who wished to see the dwellings of the poor improved might be hopeful of the immediate future with the long-promised Municipal Reform Bill practically in sight. Mr. Judge, in conclusion, said that it was of the utmost importance that reliable data should be forthcoming at the present time, seeing that the earnest attention of the public had been aroused; and he proposed the following resolution, viz.:—'That the Council of the Parkes Museum be requested to appoint a special committee of medical men, architects, and engineers, to inquire into and report on the condition of the dwellings of the poor.'

Mr. H. Rutherford, member of the Council of the Sanitary Assurance Association, seconded the resolution, which was passed after some further discussion, in which Dr. G. V. Poore, vice-chairman of the Museum, referred to the overcrowding existing among the residents of Soho, where the dwellings of the wealthy of a century ago were now occupied by the poor.

A vote of thanks was given to Mr. Darbishire for his valuable paper.

THE PEABODY FUND.

THE trustees of the Peabody Donation Fund, Lord Derby (chairman), the United States Minister, Sir Stafford H. Northcote, Sir Curtis M. Lampson, Mr. J. S. Morgan, and Mr. G. C. Lampson, have just issued their annual report for the year 1883. They say:—

The net gain of the year, from rents and interest, has been 25,252*l.* 16*s.* 2*d.*, as shown by the annexed accounts. The sum given and bequeathed by Mr. Peabody was, in 1862, 150,000*l.*; in 1866, 100,000*l.*; in 1868, 100,000*l.*; and in 1873, 150,000*l.*; making a total of 500,000*l.*; to which has been added money received for rent and interest, 329,863*l.* 15*s.* 8*d.*, making a total fund on Dec. 31 last, 829,863*l.* 15*s.* 8*d.* In addition to this the capital account has been increased by 390,000*l.* borrowed from the Public Works Loan Commissioners and others, of which sum their remains unpaid 361,333*l.* 6*s.* 8*d.*, thus bringing up the total capital to 1,191,197*l.* 2*s.* 4*d.* Since issuing the last report, the trustees have expended on land and buildings 119,382*l.* 18*s.* 5*d.*, making the total expenditure to the end of the year 1,089,883*l.* 12*s.* 6*d.* During the past year the trustees have opened thirty-three blocks of buildings at Whitecross Street, St. Luke's, containing 1,878 rooms, all of which are now occupied. Eleven blocks, to contain 514 rooms, are now in course of erection at Pear Tree Court, Clerkenwell—the last of the sites bought of the Metropolitan Board of Works—and will be ready for occupation by midsummer. The trustees, having finally arranged with the leaseholders at Little Coram Street, will commence at an early date the erection of eight blocks of buildings, to contain 420 rooms. They will also, during the present year, build three blocks at Great Peter Street, Westminster, and begin four blocks on a plot recently purchased adjoining their buildings at Islington. Up to the end of the year the trustees had provided for the artisan and labouring poor of London 9,693 rooms, exclusive of bath-rooms, laundries, and wash-houses. These rooms comprise 4,359 separate dwellings—say, 73 of four rooms, 1,521 of three rooms, 2,073 of two rooms, and 692 of one room—occupied by 18,009 persons. The average weekly earnings of the head of each family in residence at the close of the year was 1*l.* 3*s.* 8*d.* The average rent of each building was 4*s.* 8¼*d.* per week, and of each room 2*s.* 1¼*d.* The rent in all cases includes the free use of water, laundries, sculleries, and bath-rooms. The birth-rate for the year reached 41·80 per 1,000, which is 8·01 per 1,000 above that of all London for the same period. The death-rate was 18·60 per 1,000, which is 1·77 per 1,000 less than London. The infant mortality was 155·65 in each 1,000 births, or 9·85 per 1,000 above that of London. The actual numbers of births and deaths are from returns furnished by the district registrars, and the calculations have been checked and confirmed at the General Register Office, Somerset House.

The report is accompanied by tables showing the rents charged at the various buildings and the employments of the tenants, 582 of whom are labourers, 463 porters, 277 needlewomen, 267 police constables, 201 carmen, 181 charwomen, 150 warehouse labourers, &c. The financial statement for the year is also appended. The secretary is Mr. J. Crouch, 64 Queen Street, Cheapside.

THE HOMES OF THE SOUTHWARK POOR COMMITTEE.

ON Feb. 2 a conference of School Board and district visitors, City missionaries, inspectors of lodging-houses, and others, convened by the Homes of the Southwark Poor Committee, was held at the Farm House, Mint Street, Borough, with the object of eliciting the opinions of the various officers upon sanitary matters, and receiving any useful suggestions on the subject. Mr. Cohen, Q.C., M.P., presided, and there were also present—Miss Toynbee (Marylebone), Inspector Percival and Sergeant Bridgen, of the M Division (inspectors of common lodging-houses), Messrs. J. M'Dougall, A. Hawkins, T. Hunter, J. Berry (hon. secretary), P. O'Leary, &c.

The object of the meeting having been stated by Mr. Berry, Mr. Cohen, M.P., asked those present to state what they had noticed in visiting the homes of the poor, and what they would recommend. This would enable the committee to make recommendations to the Legislature for lessening the present evils.

Sergeant Bridgen said he had occupied his position as an inspector of common lodging-houses a long time, and his experience was that, in a sanitary point of view, inspection was very valuable. The poorer people, who did not

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live in registered lodging-houses, but in tenements, did not object to the police visiting their homes, although they had no *locus standi*. The poor people knew the inspectors did not visit them as policemen, although they were in uniform, but that they did so to improve their sanitary condition. If the police had the power they could do much more good than the sanitary inspectors. Lord Shaftesbury's Act had worked immense good.

The Chairman said that if the statement they had just heard were confirmed by inspectors in other parts of the metropolis it showed that the scope of Lord Shaftesbury's Act should be enlarged.

Mr. A. Hawkins believed the School Board visitors could assist the committee very much. Last week a visitor gave him two instances of terrible distress in Southwark, and two ladies who went to the house to administer relief had to beat a retreat on account of the intolerable stench.

Mr. Hill (a missionary) confirmed what Sergeant Bridgen had said. He could take those present into rooms close by in which there were large families, but in which they could not remain half an hour without being sick. He found, however, that the work of this committee has caused in this district the revival of inspectors and collectors, the cleansing of rooms, and the reduction of rents.

A City missionary (Mr. Edwards) advocated the establishment of a Government National Building Society, by which the poor people would become owners of their houses.

Mr. P. O'Leary said a very great point to be considered was that compensation should be given to all weekly tenants evicted to make way for public improvements.

The conference closed with a vote of thanks to the chairman.

NOTIFICATION OF INFECTIOUS DISEASES IN IRELAND.

A JOINT deputation, representing the Sanitary Association, the College of Surgeons, the Irish Medical Association, and the Dublin Branch of the British Medical Association, have waited upon the Chief Secretary at Dublin Castle for the purpose of enlisting the support of the Government for a measure to settle the long-disputed question of the notification of infectious diseases. The deputation was introduced by Mr. Brooks, M.P. Dr. Macdonnell was one of the representatives of the Dublin branch of the British Medical Association, and said he was fully aware of the various proposals which had been made and the great conflict of opinion that existed on this subject. However, he believed that the Bill proposed by Mr. Meldon was, on the whole, a good compromise. The medical profession took the deepest interest in the subject, and were ready to sacrifice themselves in connection with it. Coming so much in contact with the misfortunes and sufferings of mankind, they were fully alive to the importance of the curtailment, if not actual stamping out, of infectious disease. Surgeon Hamilton said this subject had been discussed very closely by the medical profession, who had come to the conclusion that the Bill proposed by Mr. E. D. Gray, throwing the onus of notification on the medical attendant, was not wise or prudent. It had been urged that this notification by the medical attendant worked well in England, but it had been found that where the English system came into operation in Ireland their relations became very complicated. He considered the measure proposed was a good one, and would get rid of the difficulty by taking the onus of notification from the medical attendant and throwing it on the occupier or person in charge of the sick person. He ventured to say that the relationship between the medical man and his patient stood on a higher platform in Ireland than England, and this was one of the reasons why the proposal to throw the onus on the profession would not work well in this country. Mr. R. O'Brien Furlong, as chairman of the committee of the Dublin Sanitary Association, stated that the association took the same view of this subject as the medical men. There were three points which they wished to urge—first, that it was an imperative necessity that some system of notification should be introduced; secondly, that no measure would be satisfactory which was not a general one; and, thirdly, that no measure would be sufficient which was not on the lines laid down by Mr. Meldon's Bill, providing that the duty of notification should rest with the occupier or person in charge of the patient, unless relieved of the duty by the voluntary act of the medical attendant. In reply to the Chief Secretary, he pointed to a Parliamentary return containing reports from members of the medical profession in towns where it had been in operation. The Chief Secretary said it would be very important to have evidence of the manner in which the Act worked where the onus of notification was thrown on the medical profession. Dr. Jacob said that in the majority of cases the compulsory clauses were hidden away in private Bills, and no opportunity was given to the medical profession to express any opinion on the subject. In the majority of instances the medical men knew nothing about the matter until they were served with a notice that they must give notification; but in every case where they had an opportunity they protested in the strongest manner against the system. In reply to the Chief Secretary, Dr. Jacob said the experience of medical men in places where the system had been tried concurred with the views of that deputation. He said the chief reason the Irish Medical Association opposed the system of compulsory notification was not because it imposed unpleasant duties on medical men, but because they believed it would defeat the object of any Bill. Dr. Duffey, Dr. Moore, and other members having expressed similar views, Mr. Trevelyan, in reply, said it appeared that there was absolutely no dissent among the deputation as to the question of extending the system of notification to Ireland, and, in fact, over the kingdom. Neither was there any dissent as to the great advantage which resulted from the system in those towns and cities where it had been adopted. He could have at once acceded to the wish of the deputation for the notification of infectious diseases in Ireland if there were only one Bill. They had made up their minds on one point, and the greatest respect should be paid to their views. He was, however, unwilling to express any definite opinion then on the subject. He would first consult with Sir Charles Dilke, and obtain a great deal of information from prints and written documents, which would probably confirm everything which had been said by the deputation. He was very anxious to get information as to the views of medical men who had experience of the system in towns where it was worked. He asked whether any evidence had been given in regard to this particular point before the Committee which sat in 1882. Dr. Jacob replied such evidence had been tendered, but the Committee had declined to receive it. Mr. Trevelyan said it was quite plain that before any attempt was made to extend the system to Ireland and the whole kingdom, the point must be cleared up. The Government would use great diligence in coming to a conclusion, and would be considerably influenced by the very moderately expressed opinions he had had the pleasure of hearing that day. The deputation then thanked Mr. Trevelyan, and withdrew.

THE EDINBURGH SANITARY PROTECTION ASSOCIATION.

THE seventh annual public meeting of this association was held on the 18th ult., Professor Douglas Maclagan in the chair. The report of the council for the past nine months stated that the history of the association during that period had been one of uninterrupted and increasing prosperity. The membership had increased to nearly 700, and only about a dozen ordinary members had retired during the past (which was the sixth) year of the association's work, instead of 169, as was reported at the end of the second

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year, or 93 at the end of the third year. The number of inspections made during the last nine months was about 900. From March 18 last to Dec. 31 the income of the association was 850*l.*, of which 848*l.* was subscriptions received from members; and the expenditure had been 693*l.* The balance in favour of the association at Dec. 31 amounted to 340*l.*

Mr. David Dickson said they had done a great deal for the houses of the middle and upper classes, but really very little for those of the working classes, and he thought it would be a great matter if they could do a little more in that direction. It was most desirable that the association should penetrate, as it were, into a lower stratum. Professor Fleeming Jenkin said that they had been disappointed by the lack of applications from the poorer classes. There were provisions in the by-laws at the outset with reference to such applications, but these by laws had not been acted upon. Pressure might be brought to bear upon landlords, but he was not sanguine that it would come to anything. He looked to legislation as the only means by which pressure could be brought to bear upon the owners of tenements, and he thought that the different associations should combine to bring the matter before local and municipal authorities, as well as the Government.

SANITARY NOTES OF THE MONTH.

By our Roving Commissioner.

The Lamp Question.—When first I mentioned the subject of the danger arising from the upsetting of mineral oil lamps, I confess I did not think it was so widespread; but, having followed it up pretty closely, I am shocked to find the extent to which accidents are taking place all over the country. Another source of danger has since made itself apparent by the suffocation of two boys in Ireland through burning one of these lamps all night. This opens up another question for discussion, and that is the quality of the oil that is sold for burning in them. If a light is required at night, and a mineral oil lamp is selected for the purpose, nothing larger than what is known as a night lamp should be used. In the old days, when camphine was in the ascendant, it was no common event for an individual burning one of those night lamps on awaking in the morning to find his or her face dotted over with a collection of black spots—particles of carbon that had been given off by the lamp through imperfect combustion; but as the various grades of mineral oil now in use are generally presumed to be of better quality than the spirit alluded to, the use of such night lights is not open to the same objection. But to use a full-sized lamp during sleeping hours without anyone to attend to it, is not only to be discountenanced from a sanitary point of view, but, as events have proved, likewise highly dangerous. But the danger connected with these lamps is, perhaps, deeper seated than may appear at first sight, and may be traced to a combination of causes, and I cannot do better than call the attention of your readers to the following circulars proceeding from the Petroleum Association:—

Office of the Petroleum Association:
85 Gracechurch Street, E.C.
London, January 26, 1884.

Sir,—At the solicitation of the Standard Oil Company of New York, I am visiting this country for the purpose of investigating on their behalf the complaints which have been addressed to them in reference to the burning quality of the petroleum oil recently shipped. It is the desire of the Standard Oil Company to maintain the highest possible quality of their products, and I am authorised to assure the petroleum trade of the United Kingdom that no effort on the part of the company will be spared to remove any ground of reasonable complaint which my inquiry may disclose. The Standard Oil Company recognise that it is natural to attribute solely to the character of the oil any difficulty which may be found in obtaining a satisfactory light from the lamp, but it is only right that I should point out that recent experience in the United States has shown that such difficulty is, in many cases, largely attributable to the inferior nature of the wicks, or to the use of burners which are either inherently defective or have become so by careless handling. The Standard Oil Company have, for some time past, been engaged in examining wicks and burners used in America, and so defective have they found the former that they are now taking steps to manufacture and supply a wick of good quality. The Standard Oil Company do not advocate the use of an unduly thick or very loosely-woven wick, but experience has proved that wicks must be made of the best cotton, and the company cannot too strongly condemn the shortsighted policy of vending a wick which is either of inferior materials or improperly woven. My investigation will, therefore, be primarily directed to ascertaining, by the collection of evidence as well as by personal observation and experiment, the real character and source of the complaints, and in this I ask for the cordial co-operation and assistance of the petroleum trade of the United Kingdom, assuring the trade that if it can be proved to the Standard Oil Company that the burning oil now manufactured by them is susceptible of such improvement as will better adapt it to the requirements of the trade in the United Kingdom, this improvement will follow. Communications relating to the object I have in view, as herein set forth, may be addressed to me, to the care of the Petroleum Association, at the above address.—Your obedient servant,

F. W. Lockwood.

London, January 30, 1884.

Sir,—With reference to my circular letter of the 26th instant, I have to state that I purpose visiting Liverpool, the West of England, Hull, and Dublin, with a view of taking samples of shipments of petroleum oil of which complaints have been made, and collecting specimens of the wicks and burners commonly used. At my request Mr. Boverton Redwood, F.C.S., F.I.C., secretary of the Petroleum Association, has been authorised to associate himself with me in the conduct of the investigation which I have undertaken. Mr. Redwood will accordingly accompany me in my visits, will examine the samples taken, and will in due course make an independent report upon the subject.—Your obedient servant,

F. W. Lockwood.

In connection with these circulars the Council of the Liverpool Petroleum Association assembled on Wednesday, the 6th inst., to meet Mr. Lockwood. At this meeting the speakers urged that the trade had been subjected to very serious loss and inconvenience by the importation of oil that would not burn satisfactorily. In reply, Mr. Lockwood said, that if the quality of the oil could be improved it certainly would be, and that it would be his business and that of his coadjutor to determine where the fault lay; and, alluding to the substance of the circulars above reported, said it was in the highest degree desirable that the appliances for burning the oil should be as perfect as possible, and that he had found considerable ignorance existed as to the proper mode of using a petroleum lamp, and he proposed to draw up and circulate a small pamphlet containing the necessary instructions. It is clear that if it has been found necessary to send a gentleman of experience from America to inquire into this question, we must have been travelling upon a dangerous road for a long time, which, I trust, will soon be amended.

Electric Lighting.—While upon the subject of lighting I would call attention to the excellent manner in which the arrangements for this purpose at the new Prince's Theatre have been carried out. Mr. Edgar Bruce has wisely called to his aid a combination of gas and electricity, a plan that, I think, will find favour in other quarters. The fittings that were designed by Mr. Phipps, the architect of the building, have been made by Messrs. Strode & Co., of Osnaburgh Street, a guarantee as to quality and good workmanship.

The Annual Building Exhibition at the Agricultural Hall.—I have been asked to state that this exhibition is likely to prove in every respect equal to that of last year, which was generally admitted to have been the best that had been held. At the approaching one, which will be opened on March 24, we are promised several novelties in lighting, sanitary matters, and machinery, and under the able management of Mr. Philip Shrapnell, the secretary, the general arrangements will, I believe, be of the most satisfactory character.

John Thomas Holland, the keeper of a common lodging house in Bridge Road, Battersea, has been summoned by the police for allowing the floors of the passages and bedrooms to remain in a dirty condition, and fined by Mr. Paget 40*s.*, with 2*s.* costs.. The defendant's wife innocently remarked that it was a very strange day to visit the house after the men had been drinking.

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REPORTS OF MEDICAL OFFICERS OF HEALTH.

CALVERLEY URBAN.—Mr. Giddings has good reason for congratulating his authority upon the remarkably healthy state of their district during the year 1882. Two deaths from infantile diarrhœa made the sum total of the mortality from zymotic causes, and none of the remaining 49 deaths could be traced to sanitary defects. Thirteen, or a little more than one-fourth, were from chest affections. The population of the district has been reduced to 2,480 persons owing to the annexation of Thornbury to an adjoining union, and amongst these the death-rate represented a little over 16·1 per 1,000. Without making any special complaint, Mr. Giddings thinks that the time has now arrived for improvement to be made in the sewerage arrangements by the abolition of the old walled drains and the construction of a proper system of sewers. The authority are also advised to adopt some regular plan for the construction of ashpits, so as to admit of a ready removal of the contents.

CHAILEY RURAL.—Mr. Gravely has little of interest to record in this district during 1882. There was an increase in the mortality from chest complaints and from zymotic disease as compared with 1881, but it is difficult to arrive at the actual figures, owing to the absence of statistical tables. Diarrhœa and dysentery were fatal to four persons, and whooping-cough to three, but there were no deaths from continued fever, scarlatina, or small-pox. The general rate of mortality represented 15·0 per 1,000 against 11·14 reported in 1881, the increase being attributed to the increased fatality from chest affections.

CLEATOR MOOR.—As in many other districts, the deaths from diseases of the respiratory organs in Cleator Moor were in 1882 considerably above the average, 62 persons dying from them as against 44 in the previous year. The mortality amongst children was also in excess, and to this cause is attributed the increase in the general death-rate from 13·9 per 1,000 to 14·52. Zymotic diseases were less fatal than in 1881, but the prevalence of scarlatina occasioned some trouble to Dr. Eaton, who complains of the neglect of the sufferers by their parents. The general ignorance and carelessness with regard to infection are indeed deplorable. But little sanitary work of importance was carried on during the year, but a number of nuisances in special localities were abated.

EAST DEREHAM.—In completing a system of sewerage and providing a public supply of water of undoubted purity, Dereham has set an example which many larger places might well follow. Beyond the giving way of some of the bends connecting the house drains, which has been brought about chiefly by the treacherous nature of the soil in which the pipes are laid, the sewerage system has worked admirably. The water is at times liable to become discoloured by oxide of iron, and Mr. Bird Vincent, the health officer, advises intending consumers to use galvanised iron pipes only. The year was marked by a sharp outbreak of scarlet fever, the four cases which occurred each terminating fatally. Three deaths happened in one house after a very few hours' illness, while the fourth case was rapidly fatal. Of measles there were ten cases and four deaths, which arose from lung complications. Twenty-six children under two years of age succumbed from various maladies, and in referring to this mortality Mr. Vincent states that the plan of giving to each parent when the birth of a child is registered a pamphlet entitled 'Simple Rules for the Management of Infants' is bearing good fruit. The general death-rate represented 16·9 per 1,000, being somewhat higher than that recorded in the previous year. This, however, seems to have been caused by conditions over which a sanitary authority has little control, and does not justify the exaggerated reports spread abroad as to the unhealthiness of the town, to which Mr. Vincent refers at considerable length.

NORTHAMPTON.—During 1882 considerable attention was devoted by Mr. Lee Cogan to periodical inspections of various parts of his district, where sanitary investigations were more especially called for. A large number of streets and courts were visited; and defects of bad house drainage, external drainage, both closet and surface, and filthiness and general unwholesomeness of the houses, &c., were noted. Notices were promptly issued for the removal of these conditions, but as regards the special localities inspected the report does not say with what result. Notwithstanding the efforts of the water company there has been no extension of the supply, which is quite insufficient for the inhabitants, and Mr. Cogan anticipates a repetition of the inconveniences experienced in past years. The sewerage system does not work quite satisfactorily, especially as regards ventilation, and the health officer properly draws attention to this subject. Small-pox appeared in the district in the early part of the year, and continued to prevail until April, causing altogether seven deaths; but as three occurred in a hospital outside the district, they do not appear in the death-roll of Northampton. The outbreak amply demonstrated the value of vaccination as a prophylactic, the disease being especially severe in those patients who had never been protected, and in others who had not been revaccinated the seriousness of the attack was controlled by the lapse of time since the performance of the operation in childhood. To scarlet fever 11 deaths are referred, most of the fatal cases resulting from some of the usual sequelæ of the disease, and not from the primary intensity of the fever. Reference is made in the report to the mischievous agency of schools in spreading the infection of this disorder, and Mr. Cogan fears that this subject does not receive sufficient attention from the school authorities. Together, the zymotic diseases accounted for 92 deaths out of a total of 962 from all causes, the death-rates being respectively 1·7 and 18·0 per 1,000.

ROTHERHAM URBAN.—Dr. Hardwicke's report reveals a state of things by no means satisfactory. The town is, to use his own words, 'still deluged with smoke, and the number of chimneys from which smoke is emitted unconsumed has increased,' while, owing to the non-enforcement of the by-laws, the public streets are frequently made the receptacles of offal and rubbish. In referring to the condition of the abattoir, Dr. Hardwicke expresses his surprise—as well, indeed, he may—at again finding the walls defiled by pieces of flesh thrown against them, where they stick and afterwards decompose and become offensive. In a previous report this abuse of the premises was prominently brought before the authority, and the imposition of a fine recommended, but nothing has been done. Some additional sewers were laid during the year, and a few street improvements were completed, but no steps have been taken towards providing the borough with an infectious hospital, which seems sorely needed. Estimating the population at 35,547 persons, Dr. Hardwicke returns the death-rate at 20·98, which is considerably in excess of that recorded in 1881, and slightly above the annual average for nine years. To zymotic diseases 101 deaths were referred, measles accounting for 48, scarlet fever for 24, and whooping-cough for 11. All three disorders assumed the proportions of epidemics, but the report contains little mention of the circumstances attending their origin and spread beyond a comment on the extraordinary belief amongst parents that children must inevitably suffer from one or all of them, and the sooner the better.

STOCKPORT RURAL (Hazel Grove Division).—Sanitary work progresses in this district, improvement being noted in a variety of directions, notably in reconstructing old ashpits, in the demolition of old buildings, and the erection of more wholesome dwellings. In referring to the requirements of the township of Norbury for increased facilities for the disposal of sewage, and to the subject generally, Mr. Moore repeats a suggestion that the main sewers should be ventilated by means of downspouts attached to houses, in pre-

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ference to the street grids. In the latter case, he observes, the noxious gas is liberated in close proximity to the doors and windows of the dwellings, whereby the inhabitants are liable to have imparted to them the germs of zymotic disease, and pedestrians passing along the road, particularly during the prevalence of strong winds, run great risks. But there are risks connected with the connection of rain-water pipes with the drain, of which Mr. Moore takes no account, and which make it impossible to endorse his advice (see 'Hints to Sanitary Inspectors,' page 349). Little of interest is noted in regard to the mortality statistics, which, as a whole, were favourable to the district, the death-rate being as low as 14·8 per 1,000. Zymotic disease caused 14 deaths out of the total of 109, but, with the exception of a slight outbreak of measles and of scarlet fever, there was no special prevalence of these disorders.

WATFORD.—The water supply of this town is still intermittent, which, in addition to causing much personal inconvenience, induces great and wilful waste. To the principal zymotic diseases 21 deaths were referred in 1882, measles (which was of an unusually fatal form) being credited with nine, scarlatina with four, and typhoid fever with two. Commenting on the need for an infectious hospital, Dr. Brett advises that, until this has been provided, the infirmary wards should be opened for non-pauper cases. This is far from a commendable arrangement, for the independent poor are naturally reluctant to be associated with the workhouse or its belongings. Isolated accommodation could best be provided by a combination of the rural and urban authorities for the erection of a joint hospital. This scheme has worked remarkably well elsewhere. Including those registered in the workhouse, 181 deaths occurred in the district, equal to a death-rate of 17·96 per 1,000, but, excluding the pauper inmates, this is reduced to 14·49, the rate properly due to Watford being 15·68.

ILLUSTRATED SANITARY PATENTS.

4,550. (1882.) INDICATING THE PRESENCE OR ABSENCE OF WATER IN CISTERNS, &c. J. SHAW & F. MILAN, Engineers, Lockwood, Huddersfield, Yorkshire. [6*d*.]

The object of this invention is to provide apparatus which will indicate the presence or absence of water in cisterns, or other vessels or pipes, and also to provide the said apparatus with alarums, when either the water pipes, boiler, or cistern is empty or deranged.

Fig. 1 is elevation of apparatus they employ, and fig. 2 is section of same showing internal parts. The apparatus is fixed in some convenient place below the cistern and connected by pipe A to either the pipes, boiler, or cistern, as thought desirable, but for the sake of an illustration it is assumed that the said pipe is in communication with a cistern, or water pipes and boilers. B is a hollow spring or diaphragm connected to the pipe A, and capable of expanding and contracting by the internal pressure of water. The other end of the said spring is connected by link C to the toothed segment D, hinged at E, and gearing with the pinion F. A pipe G is also connected to the pipe A, and is provided with a valve H, and an alarum whistle I. As almost every cistern will vary in size, or will be placed at different altitudes, the dial plate J will have to be graduated to suit each case; they therefore form a circular slot K in the said dial plate, and secure therein loose signal tablets L and M. A tap N can be employed for cutting off the connection between the water and indicator. The action of the apparatus is as follows. After the parts have been adjusted, and the cistern full of water, the pressure thereof would be sufficient as to expand the hollow spring B and move the segment on its centre, operating the pinion F in such manner as to move the finger, or pointer P, to the tablet M, indicating a full cistern; but if the said cistern was empty, the pressure of water would be less, and the hollow spring B would therefore contract, moving the segment and wheel in an opposite direction; and bring the pointer P to the tablet L, indicating an empty cistern. So far as the cistern only being empty there is no fear of immediate danger, but should the pipes between the cistern and boiler be empty also, there would be no pressure in the hollow spring, and therefore it would contract more and more, operating the pinion and pointer through the agency of the segment,

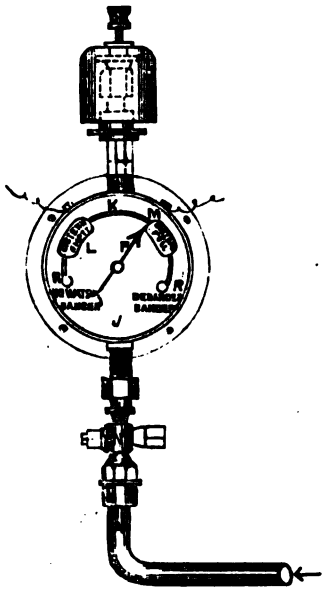

FIG. 1.

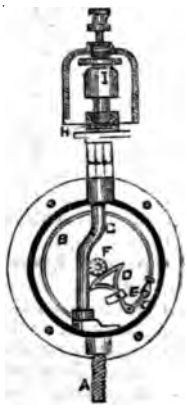

FIG. 2.

until the pointer comes into contact with the electric contact maker R, whereby an electric circuit would be completed and alarm bells sounded, thus indicating apparatus empty. If the pipes between the boiler and supply cistern or any of the outlets be stopped up by frost, dirt, or other cause, the pressure in the pipes would be great, and expand the hollow spring to such an extent as to operate the pinion and bring the pointer against the contact maker R¹, whereby the electric alarm would be sounded, but in addition to this, the pressure in the pipes would lift the weighted valve H, allowing water or steam to escape, thereby preventing any further damage, whilst the escaped steam would blow off the whistle I.

1,906. (1883.) IMPROVEMENTS IN STOVES. J. A. HARRISON & T. F. SHILLINGTON, Belfast. [6*d*.]

This invention relates to various improvements in the stoves described in the patent dated Aug. 20, 1873, No. 2,749.

The present improvements are illustrated in the accompanying drawings, in which fig. 1 is a vertical central section of one form of this improved stove. Figs. 2 and 3 represent a horizontal section and a front elevation, drawn to an enlarged scale, of part of the said stove. Fig. 4 is a vertical central section, and fig. 5 is a horizontal section of another form or modification of the improved stove.

One object in view is to provide simple, convenient, and efficient means for the removal of ashes from the stove without causing the dust to rise and spread through the room. In order to effect this object they form a chamber or receptacle, A, for the dust and ashes, in the base below the fuel chamber, B, as shown in fig. 1. The receptacle A is provided with a tightly-fitting door, C, in front, and, when necessary, with a removable pan, D, to receive the falling ashes. The bottom of the fuel chamber, B, is sometimes made without firebars or other grating, and is then preferably formed of a solid fire-clay slab, E, as shown in

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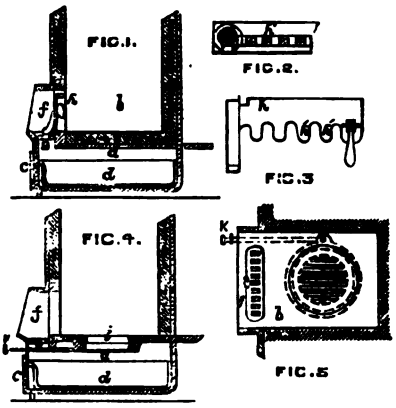
fig. 1. In front of the solid bottom and inside the air door, F, they form an aperture or passage leading into the



ashes receptacle below. This aperture is provided with a grating, G, so that when the refuse is being removed from the stove the dust and ashes only will fall into the receptacle. To prevent the falling forward of the fuel on the said grating, they provide a bar, H, similar to that employed in the stoves described in the said former specification, with the exception that it has a row of teeth, H^1, projecting downwards, which teeth retain the large pieces of fuel in the fuel chamber, but allow the ashes to fall through, between, or below them. The bar H is hinged at one end in such a manner that it forms a door, which can be readily opened for the removal of large pieces of fuel. According to one arrangement, instead of making the bottom of the fuel chamber, B, a solid slab, they provide the same with a central grating, I, preferably made circular, as shown in figs. 4 and 5, and having a rod, K, attached to it at one side, which rod passes out through the body of the stove, so that the attendant can move it backward and forward, and thereby shake the ashes and dust down through the said grating into the receptacle A, or drawer D. When they provide this improved stove with a bottom grating or with fire-bars below the fuel, they provide for the admission of air by means of an air-door, and the air on entering will pass down through the front grating, G, into the ashes receptacle, A, and thence to the fuel through the fire-bars or grating, I, in the base of the fuel chamber. Instead of admitting the air through the said air-door as above described, it can be admitted through the ash-door, C, which opens directly into the ashes receptacle, A, using the upper door simply for cleaning out the fuel chamber.

1,944. (1883.) MEANS FOR FACILITATING THE APPLICATION AND USE OF APPARATUS FOR DETECTING LEAKS IN WATER OR GAS PIPES. J. J. TAYLOR, C.E., Westminster. [6*d*.]

This invention relates to improved means for facilitating more especially the use of telephones or microphones for detecting leaks on the system for which a patent was granted to Abbott Quincey Ross, bearing date July 19, 1882, and numbered 3,430, and has for object the avoidance of the necessity for fixing a stop-cock in the service pipe before the existence of waste can be ascertained, but it is also applicable to cases where means other than telephones or microphones are employed for distinguishing the sounds occasioned by the passage of water or gas running to waste.

The invention consists in connecting to the pipe or channel in which leakage or flow is to be detected, a prolongation or projecting piece composed of a material which is a good conductor of sound, such prolongation or projecting piece being continued from the said pipe or channel up to, or as far as, the ground or other accessible position. The telephone, microphone, or other apparatus for detecting the sound can then easily be applied to the end of the said prolongation or projecting piece without disturbing the ground or other material surrounding the pipe, and without requiring a stop-cock or special box to surround the same.

As leakage in water mains and connection pipes unaccompanied by consumption generally occurs only at night, it is necessary that the inspector of waste should have some simple means of finding the position of each house connection, and of being able to hear leakage through it, without touching the pipe itself, which may be at a distance of two feet or more below the ground, and as in many waterworks these communication pipes are not provided with any stop-cocks or means of access from the surface, the present invention is designed to supply the place of such means of access, and to provide a cheaper means of access in the case of new services than any heretofore in use; it also marks the position of the pipe or channel so that the inspector has no difficulty in finding such position, and in ascertaining by the sound, either by day or night, whether leakage is going on or not.

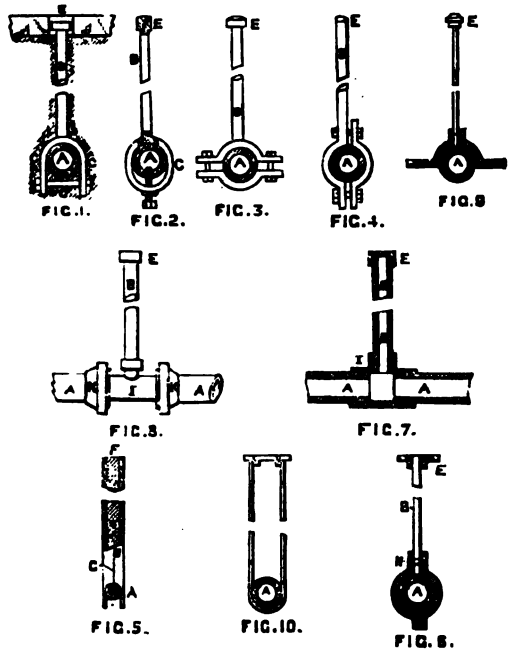


Fig. 1 illustrates one arrangement. A is the pipe or channel in which the leakage or flow is to be detected. B is the prolongation or projecting piece which forms the sound chamber, and which may be conveniently formed of a length of iron pipe, to the lower end of which is welded or otherwise attached a forked piece C, in the branches of which are formed holes, through which is passed a bolt D for securing the prolongation or sound chamber to the pipe or channel A, and for obtaining good contact between the sound chamber and the said pipe or channel. The upper end of the sound chamber B may be closed by a cap E or by being welded over, and in some cases it may be broadened out, as shown, to offer a larger surface, so as to make it more easily found for the application of the telephone, microphone sounding rod, or other sound transmitting or increasing device. By removing the cap E access can be had to the pipe A through the hollow sound chamber B for the application direct thereto of the stem of the telephone or other instrument employed. Fig. 2 illustrates an arrangement more especially applicable to new pipes or channels, the pipe A being threaded through the bow C, or the latter passed over the pipe A when the latter is being fixed. The set screw D serves to secure the

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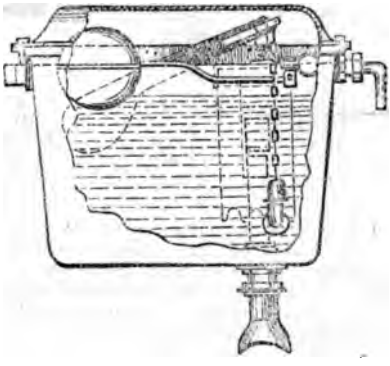
apparatus to the pipe A in the required position. Figs. 3 and 4 illustrate arrangements in which the prolongation or sound chamber B is connected to the pipe A by clips or cramps and bolts and nuts. Fig. 5 illustrates the sound chamber B, composed of a plain piece of pipe, the lower end of which is notched out so as to fit over the pipe A, and in order to cause the sides of the said notch to spring tightly against the pipe A the lower end of the sound chamber B may be split up a short distance as at G. The sound chamber B may be filled with dry wood F to facilitate the transmission of sound. Fig. 6 illustrates an arrangement in which the sound chamber B is connected to the pipe A by means of a short length of lead pipe H, the lower end of which is split, and the two branches thus formed are squeezed round the pipe A after the manner of a clip. This arrangement combines great cheapness with good contact between the sound chamber and the pipe, and avoids galvanic action between them. In the examples above described, and shown in the figs. 1 to 6 of the drawings, the prolongation or sound chamber B is not connected internally with the pipe or channel A, so as to allow water or gas to pass into it; but in fig. 7 the prolongation or sound chamber B is screwed into a T piece I in the wrought iron pipe A, so that water or gas, as the case may be, can pass from the pipe A to the end of the sound chamber B. Fig. 8 shows a similar arrangement applied to a lead pipe A, the T piece I being furnished at each end with screw unions K K. Instead of filling the sound chamber with dry wood, as shown in fig. 5, it may be filled with cement, or with carbon, or other good sound-conducting material. If carbon be employed it may be prepared as for microphonic use, or be employed as a rod.

2,099. (1883.) APPARATUS FOR FLUSHING WATER-CLOSETS AND URINALS, &c. J. HAIGH, West Bromwich, Staffordshire. [6d.]

This invention has reference principally to water-closets and consists of the construction and arrangement of the parts of apparatus for flushing. The invention is, however, applicable to the flushing of urinals and to other like purposes.



To describe the invention in connection with a water-closet the cut shows a side elevation and part longitudinal section.

The service pipe of the water-closet, which is made of iron, rises through the bottom of the water cistern to a height somewhat below the water level. Over the service pipe is an inverted cup or bell jointed to a lever and supported in its raised position by a counterbalance weight. The lower edge of this bell is scolloped or has an undulating figure so that when the said edge rests on the bottom of the cistern there is a free passage for water to the interior of the bell. Fixed in the interior of the bell, and at its top, is a short copper pipe which slides watertight upon and constitutes a prolongation of the service pipe. Openings at the top of this sliding pipe permit of a free passage of water.

The action of the apparatus is as follows:—When the cord or chain of the apparatus is pulled it depresses the end of the lever carrying the bell. By this depression of the bell the pipe fixed in its interior is depressed upon the service pipe until its openings are below the water level. Water entering the service pipe through these openings, a syphon action is set up, the service pipe constituting the long leg of the syphon and the bell the short leg. The flow of water down the service pipe continues until the level of the water in the cistern sinks below the scollops on the bottom edge of the bell, when air entering the bell the flow of water ceases. In order to prevent waste of water by the fixing of the lever carrying the bell, the apparatus is used in connection with a divided cistern in which the fixing down of the lever closes the communication between the two compartments of the cistern as is well understood.

NEW INVENTIONS.

DR. JAEGER'S SYSTEM OF SANITARY WOOLLEN CLOTHING.

MENTION has been made on more than one occasion in the columns of the SANITARY RECORD of the Sanitary Woollen Clothing invented by Dr. Jaeger, of Stuttgart, which was introduced here about three years since in the form of underclothing for both sexes, and received the unqualified approval of many members of the medical profession. The underclothing, however, is only a portion of the system advocated by the inventor, who contends that every article of clothing should be composed of pure wool, and that bed clothing should be made of the same material. The introduction of the underclothing would appear to have been effected before the promoters were ready to carry out their projects, for the establishments they opened were suddenly closed, much to the regret of many who were prepared to aid the movement, and the underclothing could only be obtained at one or two establishments for the sale of hygienic clothing, and has almost been forgotten. At length arrangements have been made for the introduction of the Sanitary Woollen Clothing into the United Kingdom in its entirety. Dr. Jaeger has relegated his patent rights to Dr. Jaeger's Sanitary Woollen System Company, Limited, and premises have been taken at 42 and 43 Fore Street. E.C., which will shortly be opened, and these will be supplemented by others for retail business in London and in other parts of the country as the trade develops itself. As the writer proposes to return to this subject as soon as the arrangements are completed, it is only needful now to state that an opportunity has been accorded him of examining many of the patterns proposed to be introduced for different kinds of clothing. Besides the underclothing, he has seen the material intended for boots, for outer garments both for men and women, even including lace for trimmings, all of pure wool and of a most silky texture; also for hats and for bed-clothes, the latter being of a desirable character. Tailors will be kept on the premises for the making of men's clothing, and a ladies' department with female assistants has been established. One advantage of Dr. Jaeger's system is a considerable reduction in the weight of clothing usually worn, while warmth in those regions of the body which require the most care is duly provided for. The underclothing has been extensively worn since its introduction, and has received a general consensus of approval on its intrinsic merits.

NELSON'S FUEL-ECONOMISING AND SMOKE-CONSUMING GRATE.

MESSRS. JAMES NELSON & SONS, Ironfounders and Ironmongers, of Briggate, Leeds, have introduced a new grate, the result of experiments carried out by them at

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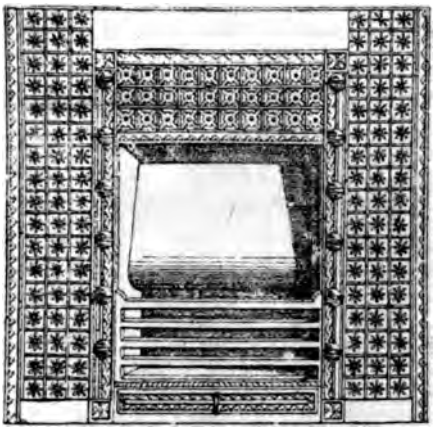
ggestion of Mr. Pridgin Teale, of Leeds, whose to economise fuel are known to many of our readers. rate in question, which is illustrated in section and ion, is very simple in its construction, being com- entirely of fire-clay of solid proportions, with the



ion of the front and bars, which are of iron. Its prin- peculiarity consists in the shape of the back and the sket, which the drawings clearly depict. By causing ick fire-clay back to project forward, and carrying e-basket some distance backwards underneath it, ter assumes somewhat of the character of a retort or e, and by this means, in conjunction with the fire- n intense heat is generated, combustion is rendered far perfect, and in proportion as this is effected so is roduction of smoke reduced. The great body of ıy employed, coupled with the shape of the grate, s the radiation of a great amount of heat. This can be obtained with a much smaller consumption of y using in addition Mr. Pridgin Teale's Economiser ed to the front, by which a slow-combustion fire is ed. Thus a fire, burning brightly and freely, or , is effected at will by this simple change. The advantages of this grate are its adaptability to any g or fireplace, the simple mode of fixing, and the ice at which it can be sold. The great fault hitherto nt in all improved grates dealing with smoke con- ion or the economisation of fuel has been their price, is very evident that if the creation of smoke is to be ited, grates must be obtainable the retail price of renders them available for all classes of houses. . Nelson & Sons appear to have made considerable ss in this direction, for they claim that they can e their invention at a price that will enable builders ages or small properties to adopt it, while it is also e of being elaborated in the most costly manner. portunity will be accorded the public of seeing this it the approaching International Health Exhibition,

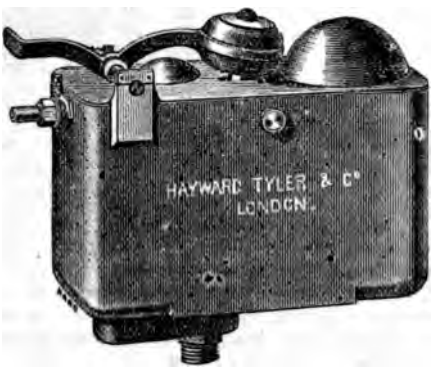
NEW WATER-WASTE PREVENTER.

llustrate an improved form of water-waste preventer shing cistern, lately patented by Mr. E. Howard, ıtroduced by Hayward Tyler & Co., of 84 White- Street, London, E.C.

ward's patent cistern is a single box-cistern, and ore of moderate size and weight; but is free from advantages attending almost all other single box- s, inasmuch as there is no interference with the of the ball valve-lever, and yet the water is perfectly from entering the cistern before it begins to escape. effected by the patent admission-valve, which has closing cut-off between the supply and the ball-

When the cistern is at rest this valve is held open arm of the lever, so that the cistern is filled by the ball-valve; but as soon as the lever begins to be raised the cut-off closes, and the water is shut off from the ball-valve. The further motion of the lever in the case of a syphon-cistern starts the action of the syphon, and in an ordinary double-valve cistern opens the outlet-valve.

These water-waste preventers have been specially approved by the authorities of the New River Company, as



conforming with their recent regulations; and from their simplicity, cheapness, and excellent flushing properties they are certain to become favourites wherever they are introduced. They are suited for all classes of closets, lavatories, &c. Every detail of the design has evidently been carefully studied; and as every cistern is tested thoroughly before leaving the works, they may be depended on to act well. The makers, whose style of workmanship is well known, have given special attention to producing the various classes of fittings required by the somewhat strict regulations introduced by the leading water companies in London and elsewhere.

THE TEMPERER (DR. BOND'S PATENT), FOR RAPID COOLING OF MILK, BEER, AND OTHER LIQUIDS.

THIS appliance is intended to be used mainly for refrigerating purposes, though it can be employed equally well for warming, where required. It consists of two parts, viz., a refrigerator (available also as a warmer) and a reservoir, and is thus complete in itself, requiring neither a fixed tank, force-pump, pipes, or plumbers' work of any kind to fit it for work, the only requisite for this purpose being a supply of water that can be conveyed to it by hand or by a pump from a well or other convenient source.

The refrigerator is a circular vessel 18 inches in diameter, and from 12 inches in height upwards, which may be placed to stand on top of any convenient support,

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according to the height of the churn or other vessel to be filled from it. It consists of three or more lenticular chambers placed on and communicating with one another, with an outlet and an inlet, by means of which water can be passed through its interior whilst the milk or other liquid to be cooled flows over the exterior, and with a special internal arrangement by means of which the water is made to circulate through the interior in such a way as to obtain the best possible results from it. The water required for this purpose is conveyed by means of an elastic tube from the reservoir, close to which the refrigerator stands, and a second elastic tube carries it away to the level of the bottom of the reservoir outside, where it may be allowed to waste or be collected for use again. Where a tank already exists, or where water is laid on by high pressure supply in pipes, the refrigerator may be used without the reservoir, being connected directly with the tank or pipes.

The reservoir is a circular tank which stands on the ground, or at a slight distance above it, close to the refrigerator, and may be supplied with water poured into it by hand or pumped into it from an adjoining pump. It holds from fifty gallons and upwards, according to size, and is provided with a special arrangement by means of which it will, when once started, continue to supply the refrigerator until it becomes quite exhausted. The vessel containing the milk or other liquid to be cooled may be placed on top of the reservoir, so that the liquid will flow direct into the receptacle on top of the refrigerator.

The statement frequently made respecting the cooling power of refrigerators, that 'they will cool *so many* gallons per hour,' is absolutely worthless, and very calculated to mislead without further information. For the cooling power of such an appliance depends on six conditions, viz. : 1, the temperature at which the milk or other liquid to be cooled is supplied ; 2, the the temperature to which it is desired to cool the milk ; 3, the rate at which the milk is supplied ; 4, the temperature of the water supplied ; 5, the rate at which it is supplied ; and 6, the temperature of the air during the operation. No statement in regard to cooling power is worth anything unless it gives details on all these points, and any statement made for any one combination of them would be untrustworthy if any of the conditions were varied. It is claimed for the Temperer that it will give as good results as it is possible to obtain by any appliance from a given quantity of water under any combination of conditions, and that these results are equal to those obtainable from much higher-priced appliances.

The price of the temperer is as follows. Refrigerator alone from 2*l*. 10*s*., according to size. Reservoir to hold fifty gallons, with milk vessel complete, 3*l*. ; ditto to hold 100 gallons, 4*l*. Full instructions for use are supplied with the appliance. Every part of it is easily cleaned.

The Temperer does not involve any necessary waste of water. Where the supply of water is derived from a well, and is limited in amount, it may, by a proper arrangement, be used over and over again without any loss.

A NEW SELF-ACTING LAMP-EXTINGUISHER.

ONE of the results of the attention called by our 'Roving Commissioner' to the constant danger arising from the upsetting of mineral oil-lamps, has been the introduction to our notice of a new self-acting lamp-extinguisher, calculated to prevent the accidents to which he has alluded. The article in question is the joint invention of Mr. R. Ogden, of 13 Mosley Street, Manchester, and Mr. R. Anderson, of Liverpool, who, though entirely unconnected with the lamp trade, have realised the serious defect in the present style of burners and endeavoured to overcome it. An illustration of their invention will be found below. Its action is as follows. To make the arrangement as clearly understood as possible, it must be assumed that the burner is one of those to which an extinguisher is fixed, that is to say, one that has a lever at the side, as shown at A, which, by being drawn down, causes a small plate to fall upon the light, and extinguish it. This arrangement, however, can scarcely be called self-acting, as it has to be actuated by the hand before being brought into operation, and is of little or no use in the case of an upset. This invention is, however, completely automatic and unerring in its effects. The drawing represents a duplex burner. B is a balance-ball or weight of solid metal, connected with the mechanism, and suspended from the fountain or oil-holder, which always maintains a perpendicular position, whichever way the lamp is turned. Above this will be observed two discs, also of metal, which are so arranged that immediately the lamp is turned over to an angle of, say, 45 degrees, as shown by the thin lines, they separate ; the lower one by the action of the weight causing the upper one to assume a position similar to that shown in the illustration, which, being connected with a simple catch or trigger—as simple as the arrangement for setting a common mouse trap—sets it free, and this again, being in connection with a spring, forces a plate over the light and extinguishes it instantly. The balance-weight works in

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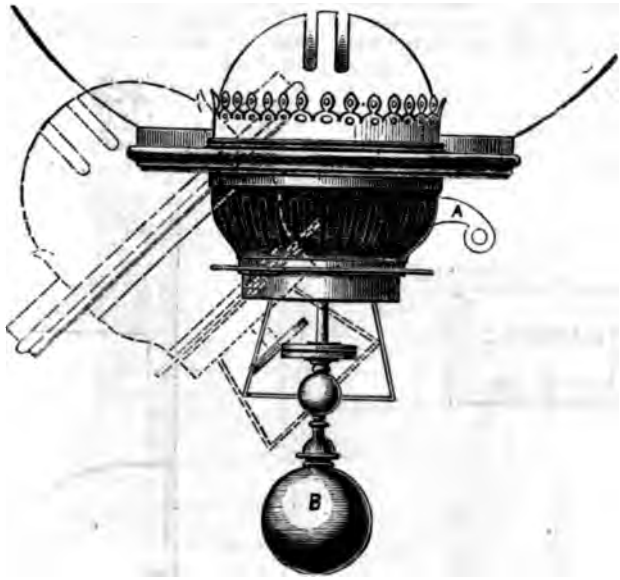
connection with what may be termed a cup and ball, or universal joint, moving freely in any direction in which the lamp is turned. Nothing is here left to chance; turn the lamp in any direction desired to the required angle for bringing the mechanism into action, and the light is extinguished; and one of its most valuable recommendations is that the lamp cannot be lighted until the extinguishing appliance is fixed ready for action should danger arise. Although shown as an attachment to a duplex lamp, this extinguisher is equally applicable to a single wick of the commonest character, the invention being a supplemental one, and not necessitating alterations in the burner itself. It is to be hoped that this invention will be placed in hands that will apply it to the cheaper description of lamps which, as our 'Roving Commissioner' has pointed out, are productive of the greater number of accidents.



THE NEW PATENT SANITARY VENTILATED DOWN QUILT.

WHEN the eider-down quilt was first introduced, it was accepted as a most comfortable, and even luxurious, addition to our bed-clothing. Imitations of it have appeared, and at the present time so-called eider-down quilts are to be purchased at prices that place them within the reach of almost every section of society. There is no objection to be urged against these coverings being filled with other materials than that of the down of the Iceland duck, providing the fillings are properly purified, and sanitary conditions thus complied with. Experience, however, has proved that one essential condition has throughout been wanting, and that is ventilation, which the present invention seeks to supply, so as to render down quilts in every sense a healthy bed-covering. Up to the present time objections have been urged that a feeling of oppression, and an undue amount of perspiration, result from the use of these coverings.

The inventor and patentee of the 'Sanitary Ventilated Quilt,' as a partner of a large firm of upholsterers in the West of England, has for some time had his attention drawn to the unsanitary condition of the old form of quilt, and has devised a simple but ingenious means of remedying the defect, by allowing the emanations from the body to escape instead of being injuriously retained within the bedclothes. The improvement is effected by perforation in various forms, that shown to the writer consisting of holes about one-eighth of an inch in diameter and about six inches apart in the centre, and rather farther apart in the border of the quilt. These perforations were filled in with specially constructed double-eyeletted buttons, which perform three operations, viz., they keep in the down, do the quilting, and ventilate at the same time.

The experiments made by the inventor to test his idea were assisted in by Dr. James Cheese, of Exeter, who certifies that they were of a most satisfactory and convincing character. A kind of steam-bath was improvised, and a quilt of the old kind, and one of the ventilated ones, were subjected to its action, a large sheet of looking-glass being placed above them. From the unventilated quilt not a particle of film was observed upon the glass, but with the new invention exhalations were freely given off. Yet the loss of warmth with the ventilated quilt was very small, amounting to only about 2° Fahr. The simple apparatus employed was constructed to represent as nearly as possible the amount of heat likely to be thrown off by a sleeper, and the gentlemen who experimented, besides others who have used the quilts, testify to the improved conditions experienced in their use. As we spend about one-third of our lives in bed, the necessity of sanitary conditions in beds and bedrooms is very apparent, and those who indulge in the luxury of eider-down quilts will do well to adopt the new ventilating variety. The inventor has arranged with Messrs. Ellington & Son, of 13 Friday Street, E.C., who are extensively engaged in the down quilt trade, for their exclusive manufacture and sale to the trade, but they will be obtainable at all drapers or upholsterers.

A HYGIENIC SEWER FURNACE.

THE question of sewer ventilation has again been brought to our notice in connection with a "Hygienic Sewer Furnace," the invention of two gentlemen at Manchester, whose representative is Mr. C. R. Jesper, of St. Andrew's Chambers, Albert Square, in that city. The inventors of the hygienic sewer-furnace contend that the simplest, most economical, and most effectual means of eradicating the danger from the noxious germs contained in sewer-gases is to apply heat near the surface of the street, and in such a manner that the whole of the air emanating from the sewers shall pass through the furnace at such a temperature that the lowest form

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of organism shall be rendered inert, and every particle of sewer-air thoroughly purified. This plan has been selected because it can be effected without any alteration of existing arrangements, and at a small cost for the apparatus itself. The manholes in the streets are the parts selected for fixing the furnaces; consequently any authorities wishing to try the experiment are not put to any serious cost. The outlay of a few pounds will purchase the appliance and set it at work, and its effects can be tested at any moment at the street grating without trouble or expense. The invention is ingenious, and worth a visit to Manchester to see it in operation. Our readers will be able to understand the construction of the furnace by the assistance of the accompanying diagrams. Fig. 1

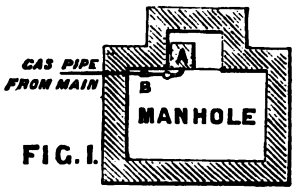

FIG. 1.

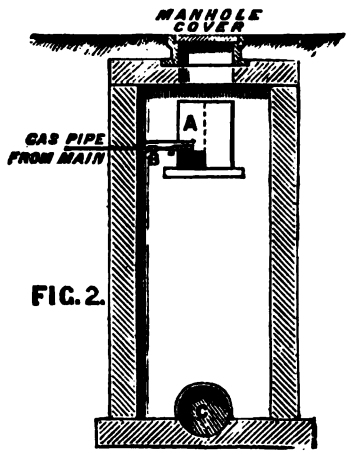

FIG. 2.

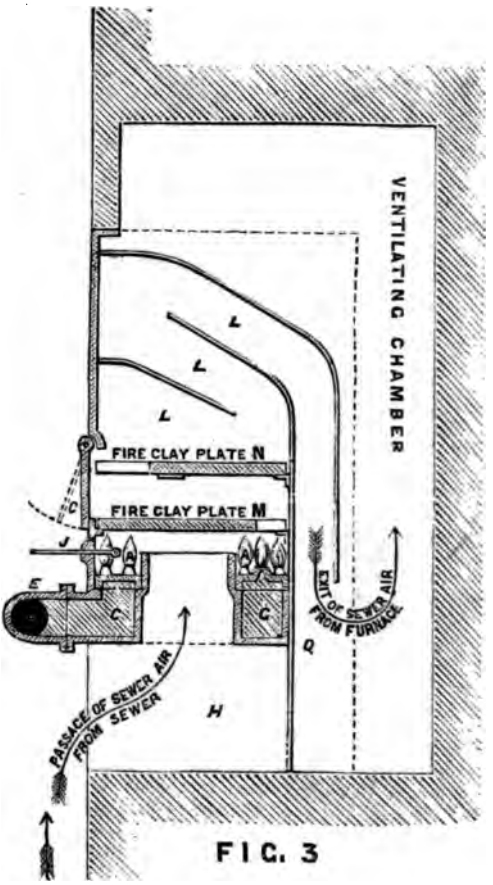

FIG. 3

represents plan of an ordinary sewer manhole, with side ventilating-chamber, in which A is the furnace and B a gas-regulator. The proximity of the gas mains are taken advantage of to provide the heating medium, a Bunsen burner being employed. Fig. 2 shows section of manhole, with face of the furnace A and mouth of sewer-pipe C. Fig. 3 is a section of the furnace as fixed in a side chamber attached to the manhole, showing ventilating chamber and passage of the sewer air, which, after passing through the fire, has to travel through the spaces *lll* ere it reaches the ventilating chamber. Fig. 4 represents plan of the furnace immediately above the burner plate *a a*, and fig. 5 is an elevation of the furnace as seen in the manhole. This also gives the dimensions of the furnace, which, it will be observed, is only 24 inches high by 17¾ inches wide. The gas, which passes through a governor regulating the supply, enters the Bunsen tube *e*, and *f* is a regulator for supplying air to mix with the gas, which is burnt through a series of jets in the burner plate. *h* represents the opening through which the sewer-air passes from manhole into furnace, over the fire-clay plates M N (which soon become intensely heated), and so on to *lll*, as before mentioned, and, after passing through the ventilating chamber, finds its exit into the street through the gird fixed near to the manhole. O is a door or damper for inspection or for regulating draught from sewer, and ensuring the perfect combustion of the Bunsen flame, and *p* is a door for clearing out sediment from the ventilating chamber of the manhole. As the flame from a Bunsen burner is naturally weak, a small jet called a 'pilot light,' burning the white flame or ordinary gas, is attached in close proximity, so that in the event of any down blow or excessive draught, causing the 'Bunsen' to be extinguished, it is immediately relighted by means of the 'pilot,' and so effective has this proved, that during the recent severe gales the furnace fixed in connection with the sewer visited was alight during the entire duration of the gale, which proved as severe a test as it is likely to be subjected to. From 7 to 10 feet per hour is the maximum quantity of gas burned, and it is urged that even this small quantity may be reduced at certain seasons of the year, or according to circumstances. In passing through the furnace the gases are subjected to a heat varying from 600° to 700° F., a temperature greatly in excess of that required to destroy the lowest class of germ life.

On the occasion of a visit o the sewer in question by the writer, the effluent ai scharged through the grid

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was found to be warm but pure, and the quantity of air being extracted as measured with an air-meter showed an average of from 950 to 1,000 cubic feet per hour, 7 feet of gas per hour being burned at the time. It may be mentioned that the outlets of this sewer are considered to be of the most noxious in Manchester, hence they were selected for experiment. So far as the quantity of discharged air is concerned it may appear to some persons to be small, but there is probably a decided advantage in this. Supposing that a much greater volume were periodically sent forth, it might be reasonably urged that it passed through the furnace too quickly, and was not sufficiently purified. If with an induced current such as is represented by the high temperature attained, the figures given are the maximum efflux, it may be assumed that the ordinary conditions of the sewer will not admit of more being extracted and efficiently dealt with, and it is better that only a very gentle motive power be used.

Besides the apparatus in Manchester, others have been fixed at St. Helens in most objectionable sewers with like satisfactory results, as testified by the medical officer of health and borough surveyor. The inventors have also secured valuable scientific testimony in a report given them by Messrs. Crace-Calvert and Thompson, of the Chemical Laboratory, Royal Institution, Manchester, who have made crucial tests in connection with a sewer furnace fixed near Manchester.

The patentees have also introduced an apparatus on a much smaller scale and price adapted to the requirements of a dwelling-house, which burns only 2 feet of gas per hour, is easily fixed, inexpensive, and completely under the control of the inmates, attributes which render it worth the attention of householders who are anxious about the healthy condition of their habitations.

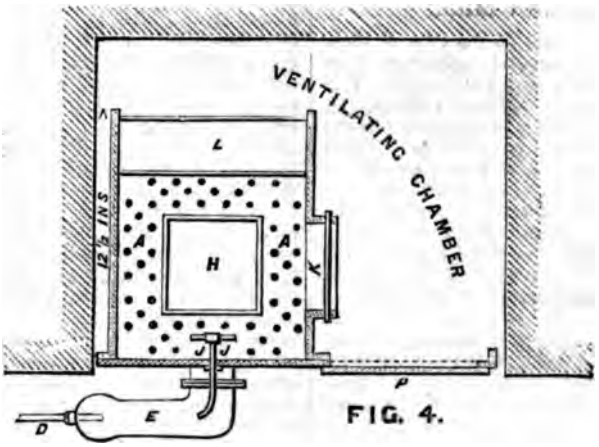

FIG. 4.

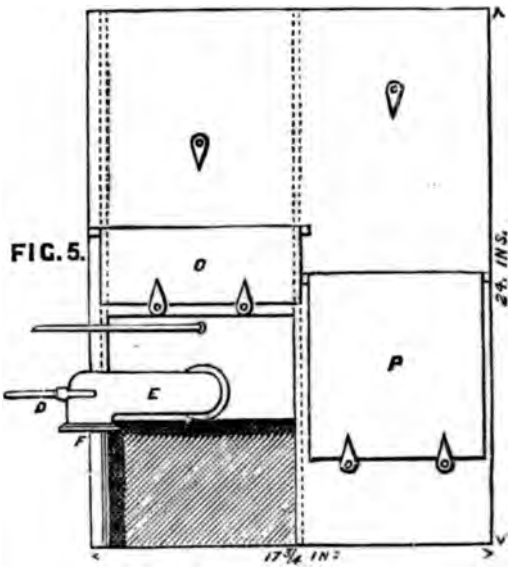

FIG. 5.

THE borough magistrates at Northampton have heard summonses against the local water company for failing to supply Robert Reid with water after due notice. Mr. Ashworth Briggs, barrister, contended that, taking the company's special Acts in conjunction with the general Act of 1847, the complainant was entitled to recover, notwithstanding the screening clauses as to unavoidable causes, these having a temporary meaning only. Mr. Becke's defence for the company was that the water-bearing strata within the limited area defined by the company's Act had failed through exhaustion, an opinion supported by Professors Etheridge and Judd, Sir Andrew Ramsey, and Mr. Hawksley. The summonses were dismissed, costs refused.

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CORRESPONDENCE.

[All communications must bear the signature of the writer, not necessarily for publication.]

ARTIFICIAL HUMAN MILK.

During the past year, the coroner for the City of Manchester has found that, in 200 cases of infants who have died, the cause has been traced to improper feeding. This statement reveals a very grave condition of things, and also a lamentable degree of ignorance or indulgence on the part of mothers, or other persons having charge of young children. There would be less sorrow to be derived from these figures if we could be assured that Manchester only possesses this notoriety. Such, however, is not the case. This great mortality amongst infants is not confined to Manchester alone; it is general. In Berlin it is supposed that from 30 to 35 per cent. of the children born die in infancy. In Hamburg, 23 per cent.; America, 40 per cent.; New York, 31 per cent. In some of the chief towns it is even greater. The mortality amongst suckling children in the town of St. Olaves is 360 per 1,000; Manchester, Birmingham, Liverpool, and St. Helens in Lancashire lose about one-fourth of all the children that are born alive before the end of the first year, and of the remainder, one-half die before the end of the sixth or seventh year. In Germany it is much the same, so far as the industrial towns are concerned, especially in the towns of Saxony. This alarming state of things is mainly brought about by improper feeding, the disturbance of the digestive organs by improper methods of nourishment.

During my stay in Hamburg last year, I had the good fortune to spend some hours in the Human Milk Manufactory of Herr Voltmer & Co., of Altona Holstein, where I witnessed the interesting process of manipulating cows' milk until it was rendered suitable to the wants and necessities of infant life; in fact until it assumes all the properties of human milk, so far as it is possible to produce an artificial substitute for the natural food. The difficulties in rearing infants who are deprived of their natural nourishment, have given rise to many preparations of infants' food, in fact their number is legion, and we are somewhat puzzled to know which is the best when so many are placed before us. Very few, indeed, of these preparations meet all the requirements of the medical faculty and with which they are perfectly satisfied, so much so that they have gone back to the original idea, that cows' milk, diluted with water, is the safest, and the best-known substitute for the natural food. Of course, there are other milks, as goats' and asses' milk, but cows' milk is the most easily obtained. But, supposing all other matters to be equal, there is always a difficulty in obtaining this pure, especially in large towns; and even if we are able to obtain pure and wholesome milk, it must be evident to those who have thought out this question, that cows' milk in its natural state is not a good substitute for the mother's breast. It contains too much caseous matter and is too difficult of digestion. There are other differences also in the matter of sugar and fat. Now the question of dealing with those differences in quality and quantity has been undertaken by Herr Voltmer & Co. (whose works I had the honour of visiting), and also, so far as I could ascertain, with success. The addition of water to cows' milk simply reduces the quantity of its component parts, the quality remaining the same, only in a diluted or weaker form; the nature of the milk is not changed, only weakened by the addition of the water. Therefore it is quite evident that some process of assimilation must be resorted to before it can successfully take the place of the infant's natural food. The manner in which I saw this done at Altona is as follows. The milk is brought in from the farm and examined or analysed, in order that its quality may be ascertained. It is tested for the amount of fatty matter, the albuminoids or proteids proved by precipitation, and the amount of sugar determined by means of polarisation. When this is completed and the irregularities corrected (which are generally in the matter of sugar and fat), it is ready for the next stage in the process of manufacture. We have often received the advice to boil our milk before using, in order that any disease germs it may contain may be destroyed. But during my visit to this milk manufactory I was informed that ordinary boiling was not sufficient in all cases to accomplish this; that there are some species of disease germs which outlive the ordinary boiling temperature, and that it is impossible with our present domestic appliances to kill all the bacteria in the milk; but what we cannot do, these human milk manufacturers are able to do for us. They not only give us an artificial human milk, but they disinfect it for us, and the liquid is then placed in a hermetically-sealed boiler and heated to about 100° Réaumur, at which temperature, we are told, all organisms capable of producing disease are effectually destroyed. In connection with this process, there is added to the liquid an ascertained quantity of digestive ferment, or pancreatic fluid, by means of which artificial digestion is produced. The difference observed between ordinary and human milk is as follows. By adding diluted acids at ordinary temperatures it will precipitate nearly the whole of its albuminoids or proteoids in the shape of large rough flakes. Human milk, if similarly treated with acids, would show at the commencement of precipitation *very fine* flakes; as the temperature increases these flakes become more in quantity, and at blood heat they form from 5 to 7 per cent. of the whole. The artificial milk will precipitate three or four times as much. This difference is equalised by a process of peptonisation, by which means the surplus of the precipitate matter (albuminoids) is reduced to a dissolved condition, while the remaining portion is charged to such an extent that it precipitates in the same manner as in the human milk. There are several grades or qualities of this milk manufactured in order to bring it as near as possible to the average quality of human milk at certain periods of lactation. Various tests are made during the process of boiling, and when these are complete the milk is drained off by a syphon into hot bottles, and corked on the spot; it is then ready for the market. The price, if my memory serves me correctly, is about 6*d.* per litre (1¾ pints). After witnessing this exceedingly interesting process of milk manufacture, I became anxious to know the results, and asked the proprietors how the children fared who had been fed upon this food, when they gave me the following particulars, which I feel sure will be looked into with much interest. Thirty children who had been fed entirely upon this milk gave the following results (they were sick children):—Daily average increase, first month, 39 grammes; second month, 29 grammes; third month, 24 grammes; fourth month, 31 grammes; fifth month, 24 grammes; sixth month, 20 grammes; seventh month, 20 grammes; eighth month, 19 grammes; ninth month, 14 grammes. Now these results show exceedingly well in favour of this food, because, on the authority of Professor Gerhart, the daily average increase of weight in children who are suckled or nourished by the breast is: first month, 25 grammes; second month, 23 grammes; third month, 23 grammes; fourth month, 20 grammes; fifth month, 18 grammes; sixth month, 17 grammes; seventh month, 15 grammes; eighth month, 13 grammes; ninth month, 12 grammes. It will be seen by these figures that the results are of the most satisfactory character, exceeding even those given by Professor Gerhart. One of the children numbered in the thirty, was so emaciated and wasted that he looked like a miniature old man, but this child recovered and increased in weight at the rate of 50 grammes per day. Such results as these certainly claim the attention of all persons interested in the question of infants' food, and infant mortality. Surely some enterprising Englishman will be found to look into this matter, and give the people of this country the benefit of so valuable a substitute for the natural food of children. There is no doubt that it would be highly

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appreciated by the public, and not unprofitable [to the manufacturer.

Small Heath, Birmingham. DAVID CLARKE.

[Our correspondent is not perhaps aware that Artificial Human Milk is largely manufactured by the Aylesbury Dairy Company.—ED.]

VENTILATION.

Seeing in the valued SANITARY RECORD of the 15th ult. the vexed question of ventilation again cropping up, I take this opportunity of ventilating this much misunderstood and mutilated question, and to put before your readers a system I have after years of actual test and practical experience found thoroughly effectual in all places where it has been carried out in its integrity.

In the first place, before thorough and permanent ventilation can be carried out, architects and builders must be educated up to the value of wholesome edifices and the requirements of their vocation, and on them rests for the future the 'onus of edifices being well ventilated, sweet, and wholesome, or the breeding places of diseases, ill health, and death'; for I hold that the presence of an unwholesome and fœtid atmosphere in a house is worse than a supply of tainted water to the inmates. The former you are always inhaling, and poisoning the body through the lungs, the latter you are not always drinking, and the constitution has time between drinks in a measure to recruit itself.

With this gentle hint as to the pernicious effects of a tainted atmosphere, more especially in bedrooms, where its effects are well absorbed into the system during sleep, I will proceed to explain my system for sure, permanent, and 'inexpensive' ventilation that cannot be put out of order, and will last so long as the edifice itself.

We all know that all impure, foul, or heated atmosphere will ascend to the ceiling of a room; at present there it stops; it cannot get out, and there it thickens till the strata gets so as to come in contact with the heads and mouths of the inmates; then the cry comes, what a headache 'that gas' gives me. After a time another cries out, the closeness of this room makes me feel quite unwell, and this must always be the case if houses are as at present constructed. The remedy is close at hand, and is as follows:—

In all rooms near to the ceiling and in convenient places, I put air bricks or grids—these open into especial flues built or left in the thickness of the wall and continued up and through the wall plate to the roof, and to that part immediately under it, which I call the exhaust chamber. This exhaust is kept up by a ventilating ridge or cresting made in keeping with the building, handsome in appearance, and with immense exhaust proclivities. Thus all rooms in a building, if only connected by the aforesaid flues with the roof, can be at once well and permanently ventilated, and in summer weather, when ventilation is most requisite, the rarefaction caused by the heat of the sun on the slates increases the action in flues, fourfold—'the thing required.'

Amongst children ill-ventilation is productive of many diseases. The external admission of cold air is a fallacy, although much practised in hospitals and sick wards. It is a positive infliction. A rough north-east wind is blowing on the side the air is admitted; soon the patients call out it is killing them. So it is. But nurses and the authorities have no other method at hand, and so it must be. This cold blast does not ventilate; it only causes a cold air to rush about and push the polluted atmosphere into corners. By my system, heat, smell, and the atoms of disease floating in the house, are at once exhausted and sent away into space through the roof, causing a vacuum, into which comes the fresh air from invisible sources, yet still it comes; nature abhorring a vacuum.

In lying-in and consumptive hospitals, where the temperature is required to be always at the same degree, I insert into these egress apertures, mercurial air-valves which can be set to the doctor's orders. If the ward gets higher than the prescribed standard the valve opens, lets out the excess heat, and, when the room cools to the standard point, closes, and thus automatically keeps the temperature always at one and the same level.

HARCOURT THOMPSON, C.E.
22 Victoria Buildings,
Deansgate, Manchester.

January 20.

COWL TESTING.

Your suggestions on this subject in your last issue are well worth attention. The time has certainly arrived when, for the satisfaction of the public and those interested in this subject, some society which has the confidence of all parties should undertake this work. Even if the statement of the Committee of the Sanitary Institute be correct, that air-meters are unreliable, this need not delay the experiments. It is not so important to know the exact amount of air which a particular cowl will extract from a building under certain circumstances, as it is to know the relative value of the various cowls in the market. The exhausting power of a cowl varies to a large extent according to the position in which it is placed, the velocity of the wind, the angle at which it strikes the ventilator, the amount of air admitted to the building, the length of the shaft, and the difference of temperature between the internal and external air. I would suggest that a building exposed on all sides be used for this purpose, where the wind would have free play on the ventilators, as this is an important factor with most of them. The building should be well supplied with inlets, distributed throughout it. The ridge of the roof should be fitted with a number of pipes of the same diameter, and every cowl to be tested should have the pipe of the same diameter to fit over these, so that they could be easily fixed or removed. An anemometer should be inserted in each pipe, and, if possible, these should be started or stopped by a lever arrangement connecting all together. The ventilators having been fixed, the anemometers would be started and run for ten minutes or more as arranged, and the result noted. Each cowl would then be removed to the next pipe, and so on, but the anemometer would remain with its own pipe. In this way it would be possible to test every cowl submitted, with every pipe and anemometer, and that in one day; the average of the readings would be a fair indication of the capabilities of the cowls on that day. If this process was repeated over a number of days under different atmospheric conditions, it would soon be seen which cowl was the best not only for special work, but for ordinary purposes. I would further suggest that the committee in submitting their report give the market price of the cowls, for the same size of pipe, as the prices given by the makers on their lists are often misleading, the measurements in some cases being taken from the broad part of the ventilator, and in others from the shaft, which latter I consider the correct way. I should be pleased if the testing could be done without expense to the makers, so that every maker might be represented, there being no excuse for any not competing. I should also be glad if it could be carried out in connection with the International Health Exhibition. JAS. ED. ELLISON.

Victoria Square, Leeds.

We think it desirable in the interest of architects and sanitary engineers, as well as in fairness to ourselves, to ask leave to call your readers' special attention to the necessity not only of carefully testing any works at which our system may have been applied, but also insisting on a proper result being established, as in several cases where our appliances had been used we have found that a proper current of air through the drains has not been obtained.

In one instance quite lately, in the neighbourhood of Holland Park, where the works had been carried out under our 'direction,' finding after completion that no current of air was observable at the inlet, which had been specially

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designed for the purpose of ventilating the drain and soil-pipe, and knowing that this ought not to be the case, we felt certain that there must be some improper obstruction, and upon examination that proved to be the case.

Water passed freely enough down the soil-pipe, but on the ground being opened near the sentinel-trap in the drain against the sewer, a complete stoppage was found in the fresh air inlet-pipe, formed by a stone wrapped in a piece of painted canvas.

This must have occurred either from extreme carelessness or the stone was wilfully placed there to bring discredit upon our system of drain ventilation.

We may mention that prior to the obstruction being discovered it was suggested by the workman that the Banner cowl should be removed, as failing to do its intended work.

We may add that the position for the obstruction, if purposely placed, was particularly well chosen, as the said inlet-pipe was intended to admit only fresh air into the drain.

We repeat, therefore, that all architects, sanitary engineers, and others, after the works are said to be complete, should insist, as we do ourselves, that it should be proved that there is a current of air passing through the drains, &c., and this result cannot fail to be obtained wherever our system of sanitation is properly carried out.

BANNER BROTHERS & CO.

11 Billiter Square, E.C.

I am glad to observe that the question about the judgment of ventilators is having a little publicity through your columns, and I do hope the subject will have some weight with those that undertake to form judgment upon them, for I feel sure that those members of the Sanitary Institute of Great Britain cannot be aware they are pursuing a line of policy next to a delusion. For various patentees take positions in their exhibition at great cost, with the understanding that their ventilators are to receive a fair and practical trial, whereas they are put off to some indefinite period. I attended the last exhibition at Glasgow on purpose to have my ventilators so tested; but, to my disappointment, it was put off with the statement by Professor Corfield about the inaccuracy of the anemometers, and therefore I am glad to hear through your columns that there is a reliable anemometer, and I think some member should now speak out, for they ought to have known of this make. I would suggest that each ventilator should be tested for both up and down draught. Could it not be done with two opposite working anemometers? If the International Exhibition to be held at Kensington is to be the means of solving this question, the trials must be begun from the outset, and not left, as in the Fisheries Exhibition, till nearly the close, and the result should be made known as early as practicable. I quite agree that the testing should be done gratuitously, which would place all makers on the same footing, and I think the judges should lay down a certain line of action to be pursued by all competitors.

J. M. LAMB.

119 Finchley Road, London, N.W.
Jan. 29, 1884.

THE HOUSING OF THE POOR.

A DEPUTATION from the Homes of the Southwark Poor (Mint) Committee have waited on the Ecclesiastical Commissioners at their offices, Whitehall Place, to ask their kind consideration for the poor people who inhabited the houses on the area between Redcross Street and High Street, Borough, now threatened with demolition, which were the property of the Commissioners. Earl Stanhope presided, and amongst the other Commissioners present were the Bishop of Bedford, the Right Hon. Sir J. R. Mowbray, M.P., and the Right Hon. G. J. Goschen, M.P. In the absence of Mr. A. Cohen, M.P., chairman of the committee, the deputation was introduced by Mr. Andrew Dunn. The Rev. G. M. Murphy stated that the School Board had, at the recommendation of their surveyor, given sums of 1*l.* to 10*l.* to weekly tenants ejected from their dwellings. Mr. E. H. Bayley said he had a very long acquaintance with the borough, and having gone over the site in question, found the people there, generally speaking, of a decent and industrious class. Mr. T. Hunter said some of the tenants had been on the property for thirty years. Replying to the deputation, Earl Stanhope said that, previously to the deputation waiting upon the Commissioners, this question had been well considered by the latter; and they had resolved to deal as leniently as possible with the poor tenants who lived on their various properties, and especially with those who resided on the area referred to. He could only say that all the representations embodied in the memorial, and so well submitted by the various speakers, should receive the very careful consideration of the Commissioners.

BY a recent decree of the Paris Prefect of Police, no owner of furnished lodging-houses (*logements garnis*) will henceforth be allowed to let out rooms the height of which is not at least 2½ mètres (8 ft. 1½ in.), and containing a cubage of air equal to 14 cubic mètres (something over 18 cubic yards) for each occupant. The flooring is to be of some completely non-absorbent material, so as to permit of frequent washing. The rooms must be adequately ventilated by open grates or other similar simple means; while, as a further precaution, the proprietors are to be held to some extent responsible for the conduct of their lodgers. Owing to the number of inspectors the French Prefect of Police has at his disposition—a number which will be increased for the new service—there will be few of the difficulties which are encountered in our country by the insufficiency in the staff of officers employed, and by the limited powers of inspection at their disposal.

AT a recent meeting of the Milton Urban Sanitary Authority, Dr. Fisher, the medical officer of health, presented a special report on 'The homes of the poor,' with particular reference to the provisions of the Artisans' and Labourers' Dwellings Act. He found no case of overcrowding, and none of the cottages were unfit for human habitation by reason of dilapidations or structural faults. He, however, discovered a few grave sanitary defects. The Board ordered that notice should be served upon the owners to remedy these forthwith.

THE Town Council of Penzance have decided to take active measures to deal with the dwellings of the poor. Their surveyor and medical officer have been instructed to select those cases which require immediate attention, and lay them before the Council, who, it is stated, will take care that the repairs required are effected under Mr. Torrens's Act, in order to secure for the tenants a greater degree of comfort.

THE STRAND BUILDINGS COMPANY.—The twenty-sixth annual report of the executive committee of this company, which was established for the erection of improved dwellings for the working classes in Eagle Court, Strand, has just been issued. In it the committee give a short *résumé* of the transactions of the company since its formation. The company was formed under the Labourers' Dwellings Act of 1855, and it is believed that this company was the only one registered under the Act in question. The buildings consist of thirty-eight sets of rooms (two in each set) which have been continuously occupied for the last twenty-five years. The loss by arrears of rent has been so small as to scarcely call for notice. At the end of the financial year just completed the total amount in arrear was only 13*s.* The rents charged for each set of two rooms are 5*s.*, 5*s.* 6*d.*, and 6*s.* per week respectively, according to the position of the rooms. There is a

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laundry provided for the use of the tenants. Water is laid on to each landing, and a dust-shoot, communicating with the yard, is fixed on each floor. There is, unfortunately, a great and constant outlay entailed for repairs and maintenance of the buildings, in consequence of most of the rooms being occupied by large families. Such occupation, of course, involves constant wear and tear, and the committee fear that there is no probability of this expense decreasing. The dividend for the last fourteen years has been steadily maintained at 5 per cent. per annum, and the directors again recommend a dividend at this rate for the financial year ending Dec. 31, 1883. Nothing is said in the report as to the total number of people housed, nor of the rate of mortality amongst the occupants.

IN the course of an inquest held in Birmingham respecting the death of a woman, who had been burnt to death through the upsetting of a lighted paraffin lamp, the borough coroner severely censured the corporate authorities for not paying closer attention to the dwellings of the poor. In this case the stairs had rotted away, and the only approach to the one bedroom was by a makeshift ricketty ladder, with no side-rail for guidance. Deceased was a drunken woman, and it was not surprising that with such a condition of things she upset the lamp and set fire to herself. The coroner added that, 'If an accident like this did not startle those to whom the town had intrusted the care of this great community to some vigilance with regard to these wretched homes, he did not know what would.'

DR. GRIFFITHS, the medical officer of health for Clerkenwell, in a recent letter to the vestry makes the following remarks on the difficulties in housing the poor satisfactorily:—'For some years past some of the well-to-do residents of the parish have been gradually leaving their houses, which become occupied by a poorer class of persons. When these poorer people, especially the labourers, enter a house, at once begins a course of dirt and destruction. The locks and handles of the doors become toys for the children, and are soon demolished. The drain-traps are sold. The chimneys are never swept, so that the rooms become blackened and disfigured. The paper is torn off the walls, the floors and passages are never swept, and there are no mats, so the whole place becomes a mass of dirt and destruction. The water-butt lids and the dustbin lids are used for firewood, and all cocks are broken off, so that there is great water waste, which floods the yards and washes away the cement from the paving. The very hand-rails of the staircases are broken away, and even the walls are pricked with nails or something of the kind, so as to leave large holes. The windows are constantly broken and stopped with brown paper. In Clerkenwell a population of ice-sellers and French organ-grinders is gradually creeping in from Holborn, whose habits are filthy and unsanitary in the extreme. New regulations are being framed to remedy these evils, but I fear they will be nugatory in effect. These disorderly people and their children require proper training which I hoped would have been acquired years ago through the School Board.'

A LARGE conference has been held, under the presidency of the mayor, at the Town Hall, Hull, to discuss the sanitary condition of the dwellings of the poor. Opinions were expressed that an active enforcement of the Artisans' Dwellings Acts was much needed. The meeting concluded with a resolution—'That it is desirable that the Local Government Board should be invested with further powers of inquiry, supervision, and control.'

SOME important evidence has just been given before the Artisans' Dwellings Inquiry Committee of the Birmingham Town Council. Dr. Hill, medical officer for the borough, stated that in St. George's Ward—which is a typical portion of the borough—there were 25,000 inhabitants; yet a careful inspection had only revealed four blocks of property the conditions of which were absolutely prejudicial to health. In these cases, however, the want of knowledge displayed was so lamentable that it was absolutely necessary that the tenants should be instructed in the methods of keeping their premises free from filth. In one instance it was clearly proved that the owner of certain property was solely responsible for the wretched condition in which the houses were found. In the course of further evidence, it was stated that in one case—where a long lease had only two years to run, and the ground-rent was 13*l.*—the properties were rack-rented to the extent of 500*l.*, and the owner was asking 156*l.* ground-rent for the renewal of the lease; this, it was stated, was one of the great evils whereby it was impossible to erect artisans' dwellings at anything like reasonable cost (see page 394).

MESSRS. STANLEY, HALL, & CO., engineers, of 91 Queen Victoria Street, have the contract for the constructional ironwork in the new artisans' dwellings, Petticoat Square, now being erected for the City Commissioners of Sewers (Colonel Haywood, City Engineer), amounting to 6,050*l.*

AT a meeting of the City Commission of Sewers a resolution (proposed by Mr. Alderman Lawrence, M.P.) urging the necessity for the abolition of the house tax, as regards artisans' dwellings, was passed by thirty-three votes to seventeen. It was also resolved to increase the height of the rooms in the artisans' dwellings about to be erected in Petticoat Square from 8 feet to 8 feet 6 inches, at an estimated cost of about 3,000*l.*

SPEAKING at the half-yearly meeting of the Metropolitan Railway Company, Sir Edward Watkin, the chairman, said the company was under an obligation to provide forty rooms in place of artisans' dwellings pulled down, and the directors had been thinking whether they could not devote a block of land at the side of the High Street, Aldgate, for the dwellings of the poorer class of labourers, and they were considering now whether they could not, by using the simplest materials and the simplest form of construction, provide a building which might be let out in rooms at about 1*s.* 6*d.* per week, and return some 2 per cent. or 3 per cent. on the outlay.

MR. JAMES BENNETT, member of the Croydon Rural Sanitary Authority, points out that since 1880 by-laws regulating the homes of the poor, drainage, and other sanitary matters have been in force in the Croydon Rural Sanitary District, and calls attention to a report of Dr. Page, one of the medical inspectors of the Local Government Board, on the general sanitary condition of the district. In this report, which is dated Nov. 1883, Dr. Page, referring to the prevalence of zymotic diseases and the rate of mortality, says, 'In regard to recent years, the Croydon Rural Sanitary District bears favourable comparison not only with the country as a whole, but with other districts of a more strictly rural character.' The town of Croydon is not included in this district, being under the jurisdiction of a separate authority.

MR. J. CARRICK has been instructed to prepare plans for a block of artisans' model dwellings in Moncur Street, Calton, Glasgow, which will be erected by the corporation.

THE enactment empowering the making of by-laws as to houses let in lodgings, contained in the 90th section of the Public Health Act, 1875, has been declared by the Local Government Board to be in force within the Barking Town Local Board District.

PARKS AND OPEN SPACES.

MR. JOHN M'MILLAN and Mr. Peter Denny, shipbuilders at Dumbarton, have presented to that town a public park extending to about thirty-two acres. The cost of the ground and of laying it out will not be less than 20,000*l.*

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The *Citizen* states:—'We learn that a project is on foot for securing a new playground for the inhabitants of the metropolis residing north of the Thames. Mr. Robert Hunter, who is widely and honourably known in connection with the Society for the Preservation of Open Spaces, and Mr. F. E. Barnes, chairman of the Tree Committee at Hampstead, together with Mr. C. E. Maurice, have taken an active part in the movement. The idea is to acquire as a national, or at any rate metropolitan, undertaking several hundreds of acres of heath, pasture land, and beech woods between Hampstead and Highgate, and preserve them for ever as open spaces for the enjoyment of the public.'

SANITARY JOTTINGS.

SANITARY.

Alexander Ross, master of the Greenock ship *Trochrague*, has been fined £14 7*s.* (including costs), under the Merchant Shipping Act, for having failed to have on board the vessel a sufficient quantity of lime or lemon-juice for the use of the crew while on a voyage from Batavia to Greenock, and for having failed to serve out lime-juice to the crew for a number of days.

The Hospital for Epilepsy and Paralysis, Regent's Park, is being re-drained, under the superintendence of Mr. Ernest Turner. Messrs. Scrivener & Sons are the contractors.

SANITARY INSPECTION.—A more thorough supervision of the sanitary arrangements of buildings is advocated by Mr. Monckton, M.P. In a Bill introduced by him into the House of Commons, he proposes to direct every local authority to appoint sanitary inspectors for this purpose, the appointments being subject to the confirmation of the Local Government Board. To these officers are to be submitted the plans of any new building as regards the position of the drains, traps, closets, refuse receptacles, water cisterns, ventilating openings, and all other sanitary appliances. These plans are to be kept by the local authority for the purpose of future reference—an advantage to be appreciated by numerous householders who at present have no notion of the geography of their drains. In passing these plans the inspector is to be guided by certain rules. For instance, he must see that the foundation is dry and a damp proof course provided. The drains must be of adequate size, laid with a proper fall and disconnected by a ventilating manhole or trap from the main sewer, and must have their connections properly made. There must be no direct communication of the drains with the interior of the house. The soil-pipe must be efficiently ventilated and brought down outside the building, without any outlet in proximity to any opening into the building. The closets and refuse receptacles must be in proper situations, well ventilated, of proper construction, and adapted to any scavenging arrangements that may be in force in the district. All waste-pipes from sinks, &c., must discharge in the open air near, but not directly over, gullies outside the house. All water cisterns must be properly constructed and conveniently situate for examination and cleaning. Openings from the external air must be provided into all rooms, and below the joists of the ground-floor for the sake of ventilation. Not only is the officer to inspect the building during its erection, but once every year he is to inspect every building existing in his district, and whatever deficiencies he notices the local authority is charged to require the owner or occupier to supply. From his decision, however, an appeal is allowed as in the Public Health Act. The expenses of the inspectors, as well as the cost of alterations to place buildings in a proper sanitary condition, including those of opening the drains for inspection, are to be paid by the owners of the property; but any damage done by the inspection is to be defrayed by the local authority. The Bill is backed by the Marquis of Stafford, Mr. H. T. Davenport, and Mr. H. Fowler.

CORRECTION.

IN Dr. Gustav Bischof's article, 'Copper in Food,' page 353, SANITARY RECORD, Jan. 15, lines 25 and 26 should read, 'foods containing copper or lead are taken.'

COMPETITIONS.

PRIZES FOR ESSAYS ON DWELLINGS FOR THE POOR, AND ON THE RECONSTRUCTION OF CENTRAL LONDON.

THE Council of the Society of Arts have had placed at their disposal by Mr. William Westgarth, a member of the society, a sum of 1,200*l.*, to be awarded in prizes for essays on the above subjects. The first prize will be a sum of 250*l.* for the best practical essay upon the re-housing of the poorer classes, and especially of the very poorest classes, of the metropolis. The second prize will be a sum of 500*l.* for the best practical essay upon the whole subject of the sanitation, street re-alignment, and reconstruction of the central part of London.

The essays should include the following points:—1. Reconstruction of the central part of London with regard to the plan of the streets. 2. Removal of the old and poisoned soil. 3. Re-arrangement of the levels, and provision of subterranean ways for the accommodation of electric wires, pipes for water supply, sewage, &c.; also provision for warehousing.

In addition to the above, there will be three further prizes of 150*l.* each:—1. For the best treatment of the engineering considerations. 2. For the best treatment of the architectural considerations. 3. For the best treatment of the sanitary considerations. Any or all of these last-named prizes may be awarded to the same essay as that to which the 500*l.* prize may be awarded, or they may be awarded separately.

The essays must be sent in to the secretary of the Society of Arts, John Street Adelphi, not later than December 31, 1884. No essays can be received in manuscript. Two printed copies of each essay must be submitted, and it will be convenient that they should be printed in pages, with wide margins. The essays should be accompanied with such maps, plans, drawings, &c., as may be necessary, and these need not be in duplicate.

The Council reserve the right of withholding any of the prizes, or of awarding the amounts, or parts of the amounts, in any manner which may seem to them desirable. They also reserve the right of publishing any essay to which a prize may be awarded.

The name of the writer must not appear on the essay, but each essay must have written or printed thereon a motto, and be accompanied by a sealed envelope containing on the outside the same motto, and within the name and address of the writer.

The awards will be made by the Council upon the recommendation of judges, to be appointed by them, and will be final.

*** Mr. Westgarth's own views are embodied in a memorandum prepared by him, copies of which can be obtained on application at the society's offices.

APPOINTMENTS UNDER THE PUBLIC HEALTH ACT.

MEDICAL OFFICERS OF HEALTH.

EVANS, Robert William Jonathan, L.R.C.P.Edin., L.R.C.S.Edin., has been re-appointed Medical Officer of Health for the Wrexham Urban Sanitary District, at £40 for the year ending December 25, 1884.

FARR, Septimus Briggs, L.R.C.P.Edin., and L.M., M.R.C.S Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Andover Urban Sanitary district for one year.

FAUSSET, Herbert John, M.D.Univ.Dublin, has been re-appointed Medical Officer of Health for the Tamworth Urban Sanitary District, at £30 per annum.

GRANT, Frederick, L.R.C.P. Edin., M.R.C.S. Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Market Harborough, Great and Little Bowden Urban Sanitary District, at £20 per annum.

HALL, Cornelius Scamp, M.R.C.S.Eng. and L.M., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Carlisle Rural Sanitary District, at £100 per annum for three years.

HONEYBURNE, Richard, M.B.Univ.Lond., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Idle Urban Sanitary District, Yorkshire, at £40 for one year.

HYATT, James Taylor, L.R.C.P.Edin., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Shepton Mallet Urban Sanitary District, at £25 per annum.

KEMPE, Arthur Wightman, M.R.C.P.Edin., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Budleigh Salterton Urban Sanitary District, Devonshire, at £30 for one year.

LOANE, Joseph, M.R.C.P.Edin., M.R.C.S.Eng., and L.M.-L.S.A.Lond., has been appointed Medical Officer of Health for the Whitechapel district, at £230 per annum, *vice* Liddle, resigned.

MACAULAY, Thomas, M.R.C.S.Eng. and L.M., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Market-Harborough Rural Sanitary District, at £70 for one year.

MONTGOMERY, Samuel, L.R.C.P.Edin., L.R.C.S. Edin., has been appointed Medical Officer of Health for the Ovenden Urban Sanitary District, Yorkshire, at £45 per annum, *vice* Steele, deceased.

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OSBORN, Henry, M.R.C.P.Lond., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Southampton Urban Sanitary District, at £350 per annum, for three years from December 25 last.

SHAW, Josephus, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Parish of Rotherhithe, at £150 per annum, *vice* Browning, resigned.

WARTENBERG, Victor Adolph, L.R.C.P.Edin. and L.M., M.R.C.S. Eng., L.S.A Lond., has been appointed Medical Officer of Health for the St. Anne-on-the-Sea Urban Sanitary District, at £30 per annum, *vice* Dearden, whose appointment has expired.

WILLIAMS, William, M.D.Univ.St.And., M.R.C.S.Eng., L.S.A. Lond., has been re-appointed Medical Officer of Health for the Mold Urban Sanitary District, at £25 for one year.

WILSON, Robert Archibald, M.D.Univ.Glasgow, has been re-appointed Medical Officer of Health for the Lunesdale Rural Sanitary District, Lancashire, at £25 for one year.

WRIGHT, Alfred, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Romford Rural Sanitary District, at £100 for one year.

SURVEYORS, CLERKS TO GUARDIANS, INSPECTORS OF NUISANCES, &C.

ALLSOP, Mr. John, has been appointed Clerk to the Romsey Guardians, Rural Sanitary Authority, Assessment Committee, and School Attendance Committee, at £125 per annum, and fees as Returning Officer, *vice* Lordan, deceased.

AUSTIN, Mr. William, has been appointed Clerk to the Luton Guardians and Rural Sanitary Authority, Bedfordshire, at £120 per annum as Clerk to the Guardians, £25 per annum as Clerk to the Rural Sanitary Authority, £40 per annum as Clerk to the Assessment Committee, £20 per annum as Clerk to the School Attendance Committee, and fees as Returning Officer, *vice* Mr. Thomas E. Austin, deceased.

BAKER, Mr. William, has been elected a Member of the Broadstairs and St. Peters Local Board and Urban Sanitary Authority, Kent, *vice* Harrison, resigned.

BRAYSHAW, Mr. S., has been elected a Member of the Greetland Local Board and Urban Sanitary Authority, Yorkshire, *vice* Fox.

BURBRIDGE, Mr. Richard, has been elected a Member of the Broadstairs and St. Peter's Local Board and Urban Sanitary Authority, *vice* Painter, resigned.

CAPPY, Mr. William, has been appointed Collector to the Tunstall Local Board and Urban Sanitary Authority, at £90 per annum, *vice* Cross, resigned.

CLARK, Mr. Frederick Dixon, has been appointed Surveyor and Inspector of Nuisances to the Market Harborough, Great and Little Bowden Local Board and Urban Sanitary Authority, at £150 per annum.

CRAIG, Mr. John James, has been elected a Member of the Romford Local Board and Urban Sanitary Authority, *vice* Fox, resigned.

DEANE, Mr. Henry, has been elected Chairman of the Loughborough Local Board and Urban Sanitary Authority, Leicestershire, *vice* Cartwright, resigned.

GINN, Mr. Alfred Francis, has been appointed Surveyor of Highways and Inspector of Nuisances to the Chelmsford Rural Sanitary Authority, at £250 for one year, from March 25, 1884.

GODDARD, Mr. Daniel, the Inspector of Nuisances, has been appointed Surveyor and Inspector of Nuisances to the Corporation and Urban Sanitary Authority of Kendal for six months, from March 1, at the rate of £140 per annum, with assistant and office expenses, *vice* Banks, resigned, but whose resignation is to remain in abeyance for that period.

GORTON, Mr. George B., has been appointed Surveyor and Inspector of Nuisances to the Litherland Local Board and Urban Sanitary Authority, Lancashire, at £100 per annum, with house, *vice* Pearson, deceased.

HARDISTY, Mr. John, has been re-appointed Surveyor and Inspector of Nuisances to the Shepton Mallet Local Board and Urban Sanitary Authority, at £95 per annum.

HARRIS, Mr. Richard, has been appointed Treasurer to the Corporation and Urban Sanitary Authority, Wells, Somersetshire, *vice* Garrod, deceased.

HASTILOW, Mr. James, has been re-appointed Collector to the Tamworth Urban Sanitary Authority, at £25 per annum.

HARVEY, Mr. S., has been re-appointed Public Analyst for the Borough of Sandwich.

HAWKINS, Mr. Isaac Thomas, has been appointed Inspector of Nuisances for the Westhampnett Rural Sanitary District, Sussex, at £100 per annum from year to year, *vice* Ticehurst.

HEWITT, Mr. Arthur Turner, has been elected a Member of the Hove Board of Improvement Commissioners and Urban Sanitary Authority, *vice* O'Brien, deceased.

HEY, Mr. Horace, has been appointed Surveyor to the Corporation and Urban Sanitary Authority of Dewsbury, at £250 per annum, *vice* Duff, appointed Assistant Surveyor to the Corporation and Urban Sanitary Authority of Doncaster.

ISAAC, Mr. John Swinton, Banker, has been appointed Treasurer to the Corporation and Urban Sanitary Authority of Worcester, *vice* George.

JONES, Mr. Isaac, has been re-appointed Inspector of Nuisances for the Mold Urban Sanitary District, at £25 for one year.

KNIGHTS, Mr. James West, has been re-appointed Public Analyst for the Borough of Cambridge, and for the Isle of Ely, for one year.

MANLEY, Mr. James Woolley, has been appointed Collector to the Carshalton Local Board and Urban Sanitary Authority, at eightpence in the pound commission.

MARSH, Mr. John, Solicitor, has been appointed Clerk to the Shanklin Local Board and Urban Sanitary Authority, at £80 per annum, *vice* Williams.

MORGAN, Mr. William, has been re-appointed Public Analyst for Cardiganshire, for one year.

PEAKE, Mr. Richard, has been elected a Member of the Ashbourne Local Board and Urban Sanitary Authority, Derbyshire, *vice* Johnstone, resigned.

PRALL, Mr. George Wilkinson, Solicitor has been appointed Clerk to the North Aylesford Guardians and Rural Sanitary Authority, Kent, at £140 per annum, as Clerk to the Guardians, and such salary as may be voted annually, as Clerk to the Rural Sanitary Authority, the Assessment Committee, and the School Attendance Committee, and fees as Returning Officer, *vice* Arnold, resigned.

RHODES, Mr. W. C., has been appointed an Assistant Inspector of Nuisances for the Bradford Urban Sanitary District, Yorkshire, at £78 per annum, with uniform, *vice* Mason, resigned.

RICHARDS, Mr. Thomas, has been elected a Member of the Arlecdon and Frizington Local Board and Urban Sanitary Authority, Cumberland, *vice* Lace, resigned.

RILEY, Mr. F., has been elected a Member of the Rishworth Local Board and Urban Sanitary Authority, Yorkshire, *vice* Berry.

RUSHWORTH, Mr. Thomas, has been appointed Chief Inspector of Nuisances for the Oldham Urban Sanitary District, at £120 per annum, *vice* Drew, resigned.

SKINNER, Mr. J. J., has been elected Chairman of the Falmouth Parish Local Board and Urban Sanitary Authority, *vice* Handcock, resigned.

SMITH, Mr. J. C., has been appointed Assistant Surveyor of Highways and Inspector of Nuisances to the Chelmsford Rural Sanitary Authority, at £200 for one year, from March 25, 1884.

SMITH, Mr. Samuel, has been elected a Member of the Brierfield Local Board and Urban Sanitary Authority, Lancashire, *vice* Rhodes, deceased.

TAYLOR, Mr. John, has been appointed Inspector of Nuisances for the Uckfield Rural Sanitary District, Sussex, at £75 per annum, *vice* Avis, deceased.

TONGE, Mr. George Broadrick, Solicitor, has been appointed Clerk to the Great Driffield Local Board and Urban Sanitary Authority, at £70 per annum.

TOOGOOD, Mr. F., has been re-appointed Inspector of Nuisances for the Bridgwater Rural Sanitary District, at £120 for one year.

TOWNEND, Mr. Ebenezer, has been appointed Clerk to the Selby Guardians and Rural Sanitary Authority, Yorkshire, at £60 per annum as Clerk to the Guardians, £30 per annum as Clerk to the Rural Sanitary Authority, £10 per annum as Clerk to the Assessment Committee, £30 per annum as Clerk to the School Attendance Committee, and fees as Superintendent Registrar of Births, &c., and Returning Officer, *vice* Newstead, resigned.

TRENBATH, Mr. George, Clerk to the Barton, Eccles, Winton, and Monton Local Board and Urban Sanitary Authority, has been appointed Secretary to the Association of Local Boards, at £20 per annum, *vice* Goulburn, resigned.

TURNBULL, Mr. William, has been appointed Surveyor to the Worksop Local Board and Urban Sanitary Authority, at £150 per annum and an office found, *vice* Allsopp, resigned.

WHITE, Mr. C. C., District Manager of the Manchester and Salford Bank, has been appointed Treasurer to the Prescot Guardians and Rural Sanitary Authority, Lancashire.

WITTS, Mr. G. B., has been elected a Member of the Leckhampton Local Board and Urban Sanitary Authority, Gloucestershire, *vice* Trye, resigned.

VACANCIES.

MEDICAL OFFICER OF HEALTH for the Camborne, Phillack, and Redruth Urban Sanitary Districts, and the Helston Rural Sanitary District, combined.

MEDICAL OFFICER OF HEALTH for the Kington Urban Sanitary District, Herefordshire: £20 per annum.

CLERK to the Gainsborough Local Board and Urban Sanitary Authority.

CLERK to the Milverton Local Board and Urban Sanitary Authority, Warwickshire.

COLLECTOR to the Brownhills Local Board and Urban Sanitary Authority, Staffordshire: £75 per annum. Application, 18th inst., to T. Howard Stanley, Clerk, Walsall.

COLLECTOR AND INSPECTOR OF NUISANCES to the Newquay Local Board and Urban Sanitary Authority, Cornwall; election, 18th inst.

TWO INSPECTORS OF NUISANCES, one for the Kings-Norton Division, and one for the Northfield Division, of the Kings-Norton Rural Sanitary District, Worcestershire; £90 per annum each, from year to year. Applications, 28th inst., to Ralph Docker, Clerk, Colmore Row, Birmingham.

INSPECTOR OF NUISANCES for the Auckland Rural Sanitary District: £120 per annum and railway travelling expenses; application, 25th inst., to T. Dundas Bruce, Clerk to the Authority, Bishop-Auckland.

INSPECTOR OF NUISANCES for the Banbury Rural Sanitary District.

SURVEYOR to the Local Board and Urban Sanitary Authority of Ashford, Kent.

LOCAL INTELLIGENCE.

The Town Council and Urban Sanitary Authority of Southampton have, in accordance with the recommendation of a committee, increased the salary of Dr. Osborn, the medical officer of health, from £300 to £350 per annum, for three years.

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Dr. Parsons, the medical officer of health for the Bridgwater Urban Sanitary District, in his last quarterly report, states that the death-rate for that period was only 11·4 per thousand, and claims for the town the enviable distinction of being one of the healthiest in the kingdom.

At Rainham, Essex, a parish within ten miles of the metropolis, there were only five deaths last year, out of a population, according to the last census, of 1,246.

There were 182 applicants for the two appointments of Surveyor of Highways and Inspector of Nuisances, and Assistant Surveyor of Highways and Inspector of Nuisances, for the Chelmsford Rural Sanitary District, at £250 and £200 per annum respectively.

The Local Government Board have sanctioned the appointment of Mr. Ashworth as Medical Officer of Health for the No. 1 Sub-District of the Halstead Rural Sanitary District until Michaelmas next, instead of one whole year, so that the appointments for both sub-districts shall expire at the same time.

Some correspondence has lately passed between the Local Government Board and the Okehampton Guardians and Rural Sanitary Authority, which has resulted in the former declining to confirm the appointment of Mr. Bennett as Medical Officer of Health for the district at 50*l.* per annum for three years, on account of the inadequacy of the salary 'for the efficient discharge of the important duties' of the office. The subject was under consideration at the last meeting of the Authority, and they passed a resolution pointing out that the salary is the same as the Local Government Board sanctioned only one year ago, when Dr. Ash was appointed; that Mr. Bennett resides in the centre of the district, while Dr. Ash was twelve miles distant from it; that they are well conversant with the requirements of the district, which is healthily situated; and that, as Mr. Bennett is willing to act, they see no reason why the salary should be increased beyond the amount sanctioned last year, and urging the Board above to reconsider the matter.

The Gloucester Town Council and Urban Sanitary Authority have increased the salary of Mr. R. Read, their Surveyor, from £400 to £500 per annum from March 1.

The enactment contained in Sect. 90 of The Public Health Act, empowering the making of by-laws as to houses let in lodgings, has been declared by the Local Government Board to be in force within the city and county and Urban Sanitary district of Newcastle-upon-Tyne.

At Southwell, Nottinghamshire, two meetings have been held and resolutions passed, in favour of the formation of a Local Board district.

HYGIENIC INSTRUCTION IN AMERICAN COLLEGES.

We are indebted to the *Sanitary News* of Chicago for the following statement of the colleges in America and Canada, which have chairs of sanitary instruction, together with their titles:—

PROFESSORSHIPS.

Hygiene—Rush Medical College, Chicago.

State Medicine and Hygiene—College of Physicians and Surgeons, Chicago.

Sanitary Science and Hygiene—Fort Wayne (Ind.) College of Medicine.

State Medicine and Sanitary Science—University of Louisville, Ky., Medical Department.

Public Hygiene—University of City of New York, Medical Department.

Public Hygiene (also an Emeritus Professor of Hygiene)—Woman's Medical College of New York Infirmary.

Hygiene—Williamette University, Portland Oregon, Medical Department.

Sanitary Science—Royal College of Physicians and Surgeons, Kingston, Ont.

Hygiene—University of Bishop's College, Montreal.

Sanitary Science—Trinity Medical College, Toronto, Ont.

Clinic Medicine and Hygiene—Minnesota College Hospital of Minneapolis.

Hygiene and Forensic Medicine—St. Louis Medical College.

Physiology and Lectures on Hygiene—Southern Medical College, Atlanta, Ga.

Physiology and Hygiene—Quincy (Ill.) College of Medicine.

Physiology, Pathology, General Therapeutics and Public Hygiene—College of Physicians and Surgeons, Keokuk, Ia.

Physiology, Clinical Pathology and Hygiene—Iowa College of Physicians and Surgeons, Des Moines, Iowa.

Physiology and Hygiene—College of Physicians and Surgeons, Boston, Mass.

Physiology and Hygiene—College of Physicians and Surgeons, New York City.

Physiology, Pathology and Hygiene—College of Medicine, Syracuse, N.Y.

Physiology and Sanitary Science—Long Island College Hospital, Brooklyn, N.Y.

Physiology and Hygiene—Woman's Medical College of Philadelphia.

ADJUNCT PROFESSOR.

Medical Jurisprudence and Sanitary Science—Toronto School.

LECTURES.

Hygiene—Woman's Medical College, Chicago, Ill.

Hygiene and State Medicine—St. Louis College of Physicians and Surgeons.

Demonstrator of Anatomy and Lecturer on Hygiene—St. Joseph's (Mo.) Medical College; also McGill University, Montreal.

Physiology and Hygiene—Center College, Danville, Ky.

NOTES AND QUERIES.

Having for some time back been in the receipt of Queries appertaining strictly to sanitary work, and which it would be easy to answer, without having to refer our correspondent to competent professional advisers, we have opened a column in which to register such Queries and Replies thereto as can fairly be expected from us; and our subscribers and readers are invited to make such use of this column as will tend to benefit themselves and the community. Both Queries and Replies will, however, be subjected, if unnecessarily long, to a strict curtailment.

114.—COMPULSORY REMOVAL OF FEVER CASE TO INFECTIOUS HOSPITAL.

The Urban Sanitary Authority of C. have within their district a public hospital for reception and treatment of scarlet fever cases. The medical officer of health gives a certificate certifying that a child is suffering from scarlet fever, and is without proper lodging or accommodation at its own home, and it is in a fit condition and ought to be removed to the fever hospital, but her mother objects to her child's removal, and it is then necessary to procure an order for its removal under sect. 124 of the Public Heath Act, 1875. This order is obtained, is signed by a magistrate at his own private residence (the Petty Sessions Court being closed on that day), and he orders and directs the removal of the child to the fever hospital; and he further orders and directs the inspector of nuisances to carry his order into effect at the expense of the said Urban Sanitary Authority. This order, upon being duly read over and served upon the mother having care of the child, is disobeyed by her, and, further, she obstructs the officer in its execution. Thereupon she is summoned for such obstruction and disobedience. You are asked—1. At the hearing of the summons for disobedience and obstruction, was it competent for the Bench then sitting to enter into all the merits of the case? 2. Or to sit in judgment on the certificate given by the medical officer of health as to there being or not being proper lodging or accommodation at home; 3, or as to the order of removal given *ex parte*, the act of one of their brother magistrates?

INSPECTOR.

[To all of these questions we answer No. The magistrates had no right or jurisdiction to go behind either the certificate of the medical officer of health, when once given, or the order signed by a magistrate, when once made, but should have confined themselves to the fact as to whether the order had been resisted or not. This case is governed by that of Booker *v.* Tavton, which was a case that arose under Section 124 of the Public Health Act, at Coventry, on June 17, 1882. The inspector of nuisances on that day received a certificate from the medical officer of health certifying that a child of the defendant was suffering from scarlet fever, and was not provided with proper lodging and accommodation at her own home, and that the said child ought to be removed to the Fever Hospital, to prevent the disease spreading to other children. All kindness and everything that could possibly be done had previously been done by the inspector to induce the mother to allow the child to be removed to the hospital, but without effect. An order of removal was therefore necessary, and was obtained from a magistrate at his private residence, and this order when presented was resisted and disobeyed, and the defendant was summoned before the Court of Summary Jurisdiction at Coventry for obstructing the officer in carrying the order into effect, and for its disobedience. At the hearing, the magistrates took evidence as to the sufficiency of accommodation at the child's residence, and refused to convict, and dismissed the case. The sanitary authority, guided by their town clerk, decided to appeal, their reasons being that the magistrates had no right to inquire into the merits of the case, or to sit in judgment on the act or order of one of their brother magistrates, or against the certificate of the medical officer of health when once given or made, but should have confined themselves to the fact as to whether the order so made had been resisted or not. The case was heard before the Court of Queen's Bench on Nov. 20, 1882, when the following decision was given:—'That the magistrates had no right to go beyond the order, or into the merits of the case.' They therefore remitted the case back to the magistrates at Coventry, who subsequently, and having no alternative, convicted the defendant for disobeying the order.—ED.]

115. FACTORY AND WORKSHOPS ACT, 1883 (RETAIL BAKEHOUSES).

Will you permit me to inquire through the columns of your paper the manner in which various sanitary authorities propose carrying out the above Act? having special reference to any particularly headed book, forms of notice, or whether they will insist that all bakehouses in their districts shall be cleansed and limewashed during a certain month of the year, &c., &c. Any information regarding these new duties will I think be of use to many who may at present be somewhat in doubt.

HENRY HAWES, Assoc. M. Inst. C.E.
Head Inspector, Brighton.

[Forms of Register of Retail Bakehouses, Medical Officer's Pocket-book, Notices, and the like, required under the Factory and Workshop Act of 1883 have already been issued by Messrs. Knight & Co., of 90 Fleet Street, who have also published a very useful handbook by one of the officials of the Local Government Board explanatory of 'The Sanitary Regulation of Bakehouses.' We cannot at present refer our correspondent to any sanitary authority that has created any special organisation for working the Act; but he may usefully consult a report issued on the subject by the Society of Medical Officers of Health, which will be printed in the SANITARY RECORD of March 15.]

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ORIGINAL PAPERS.

REMARKS ON THE EXAMINATION OF WATER FOR SANITARY PURPOSES.

By CHARLES E. CASSAL, F.I.C., F.C.S.,
Demonstrator, Department of Hygiene, University College, London.
and B. A. WHITELEGGE, M.D., B.Sc.

THE analysis of water is a subject which has of late years excited the keenest controversy among chemists and sanitarians. In spite of painstaking investigations and exhaustive discussions, there are few subjects in the whole range of chemical science which call forth so much difference of opinion, not only with regard to the methods to be employed, but also to the accuracy of the results obtained, and the degree of importance and significance to be attached to them. At the present time additional interest will perhaps attend discussions on this subject, in consequence, firstly, of the suggestion of novel modes of investigation, depending upon the cultivation of organisms, and thus differing entirely from those in common use; and, secondly, from the recent forcible and apparently damaging criticisms to which certain of the most commonly-accepted methods of analysis have been subjected.

The object of the analyst is to determine—

1. The presence or absence of impurities in the water he is called upon to examine.

2. The nature and quantity of such impurities if present; and to form, so far as he can upon this evidence, an opinion as to the wholesomeness or the reverse of the water supply in question.

The old method of exactly estimating the different mineral constituents in the residue of a water is not of any particular importance so far as its sanitary aspects are concerned; in some rare cases it may be desirable to know the quantities of lime, magnesia, &c., actually present, but the matter of greatest moment to the sanitarian, and that in which the chief difficulty lies, is the determination of the organic impurities. Various methods have been proposed and employed for this purpose. It has been pointed out that they may all be classed under two heads—viz. (1) Those which aim at the estimation of the organic matter in the water itself; and (2) Those which aim at its estimation in the solid residue left on evaporation.

Confirmatory evidence is afforded by the presence or absence of nitrates from the oxidation of nitrogenised organic matter, and their quantity if present; by the amount of chlorides, which almost invariably accompany pollution from animal sources; by the microscopic examination, a point which is far too frequently neglected; by the ignition of the water-residue; by the smell; and by the appearance of the water when examined in a two-foot tube or a quart decanter.

Of the processes which have been employed for determining the organic matter in the water itself we have, firstly, the oxygen or permanganate process, which aims at a measurement of the amount of pollution by the rapidity and extent of decomposition of a weak solution of permanganate of potash, acting upon the oxidisable matter present; and, secondly, the Wanklyn process, which makes the amount of ammonia evolved, on boiling with a strongly alkaline solution of permanganate of potash, a measure of the quantity of nitrogenised organic matter present.

The chief process for determining the organic matter by an analysis of the dry residue, is that due to Frankland and Armstrong, who by means of a combustion experiment—*i.e.* by burning the residue with oxide of copper and measuring the amounts of carbonic acid and nitrogen evolved—estimate the quantity of organic carbon and organic nitrogen present in the solid matter obtained on evaporation.

The oxygen process as originally devised by Forchhammer is unreliable and unsatisfactory; with certain modifications and precautions, however, it forms a very valuable test, especially as affording confirmatory evidence. But we are here chiefly concerned with the two processes which have been generally regarded as rival and antagonistic ones—viz., the Frankland process and the Wanklyn process, the latter of which has unquestionably been, and still is, the most popular of all. As regards the alleged antagonism between these two methods of water analysis, our own experience leads us to agree with Dr. Cornelius Fox, that in skilled hands, and when proper precautions are taken, their results are closely concurrent, in the sense that the opinions based upon these results are substantially the same. In view of the evidence which Dr. Fox adduces, most people will probably feel disposed to agree with him also. It will be remembered that he made an attempt—by collecting and tabulating the data of analyses (made by chemists using the rival processes) of different samples of the same waters obtained under the same circumstances—to institute a comparison between the two. On page 63 of his excellent work on 'Water, Air, and Food' he thus sums up the results of his inquiry:—

1. 'In one instance only out of ninety-nine analyses, details of ninety-three of which are in my possession, is there a distinct conflict of opinion, and in this exceptional instance the divergence in the results obtained is easily explained.

2. 'The opinions do not in a great many instances coincide exactly, but the adjectives denoting them are modified by some qualifying adverb.

3. 'When the results of analyses made by the two processes at or about the same time do not at all agree, the divergence is generally due to the neglect on the part of those who practise the Wanklyn, Chapman, and Smith process, to estimate the amount of nitrates and nitrites, and to be guided by the evidence thus afforded.

4. 'The results are not concordant unless the analyses are performed upon the same water at the same time.

5. 'A really bad water would not be likely to escape detection by either process if the nitrates and nitrites are always estimated.'

A table is given on pages 64 and 65 of the same work, in which the results of the analyses, made at about the same time, of ten samples of water from very various sources, together with the opinions based on these results, are stated. The opinions are as follows:—

	Frankland Process	Wanklyn Process + Nitrates.
Sample 1	Good	Very good
,, 2	Horribly polluted	Horribly polluted
,, 3	Indifferent	Not first-rate
,, 4	Suspicious	Suspicious
,, 5	Good	Pretty good
,, 6	Good	Good
,, 7	Good	Moderately good
,, 8	Bad	Bad
,, 9	Good	Good
,, 10	Pretty good	Pretty good

It would be out of place, and moreover far beyond

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the scope of this paper, to fully describe and consider the details of the Wanklyn and of the Frankland processes, but it may perhaps be convenient to recall some of the objections which have from time to time been raised against their validity.

Inasmuch as it is necessary in the first stage of the Frankland process to boil the water with sulphurous acid, and subsequently to evaporate it to dryness, the objection has been made that some organic matter must thereby of necessity be lost or destroyed. Although it is perfectly conceivable, and indeed probable, that during a long process of evaporation organic matter may disappear, and especially that boiling with sulphurous acid may well produce disastrous effects on the organic matter in the water, yet a little too much seems to have been made of this objection. It has been said—but the ground on which the statement rests appears to be of the slenderest description—that the dangerous organic matter in water is probably highly volatile, and the Frankland process has been impugned as being incapable of measuring such volatile substances. At present, of course, this volatile poison is purely hypothetical, and consequently cannot very well be brought forward as an argument against the process; and the destruction of organic matter being very small, and not affecting the constancy of the results, the objection loses a great deal of its force.

Again, it has been asserted that the error of experiment is sometimes greater than the total quantity to be measured, and that the presence of a large amount of nitrates altogether vitiates the results. It is certainly a fact that the liability to experimental error in this process is exceedingly high, compared to that in ordinary chemical determinations of the same kind.

As regards the Wanklyn process, many objections have also been urged. By the boiling with alkaline permanganate it is asserted that the whole of the nitrogen present is not evolved as ammonia; and that the quantity of ammonia obtained is influenced by the degree of concentration and by the rapidity of distillation. As regards these objections, it should be remembered that Mr. Wanklyn himself was the first to prove that only a part of the nitrogen was given off, and to state that the process was not one for the estimation of organic nitrogen. Some water analysts have unquestionably returned in their reports as total organic nitrogen, the amount of nitrogen obtained as ammonia by boiling with permanganate. Nothing could be more fallacious, or better calculated to bring the process into discredit. Mr. Wanklyn has of course very strongly condemned this proceeding.

It cannot be too strongly insisted upon with regard to these processes, that their results do not *alone* justify the formation of an opinion as to the purity of a water, but must be taken together with the other evidences of pollution already enumerated—viz., amounts of nitrates and chlorides, microscopic examination, &c. The much too common neglect of this principle is, in our opinion, the main cause of discrepancies among water analysts. Again and again, even in cases of the greatest importance, conclusions are arrived at apparently based solely upon determinations of 'albuminoid' and 'free' ammonia, or of organic nitrogen and carbon, or even sometimes *solely* on the estimation of nitrates and chlorides. As to the estimation of nitrates, this again has been a much discussed point—strongly condemned by Mr. Wanklyn and his close adherents, and as strongly insisted on by Professor Frankland; indeed, an exaggerated importance has been attached to the nitrates by those who follow his method, if not by himself. Our own experience points to the necessity of estimating the nitrates in every case, and we can fully endorse everything that is said in support of such estimation by Dr. Fox and others.

Such, then, briefly stated, are the methods at our disposal. They have been of late severely criticised, and their value from a sanitary point of view called into question; in fact, they have to some extent been 'put upon their trial.'*

With some of the most recent of these criticisms we now propose to deal as briefly as possible.

The first point to be considered is embodied in the words of Dr. Buchanan—viz., that 'we must go beyond the laboratory for evidence of any drinking water being free from dangerous organic pollutions;' and further, that 'the chemist can tell us of impurity and hazard, but not of purity and safety.'

Secondly, it has been asserted that in cases where the absolute and relative amounts of impurity in the samples submitted to analysis are previously accurately known, the results of the analyses are often widely discrepant, both with the Wanklyn and the Frankland processes.

Thirdly, it has recently been said, and by very high authorities, that the cultivation processes are destined to supersede the present methods; and, to quote Dr. Angus Smith, that 'water analysts must be prepared for a new order of things.'

As regards the first of these objections—that chemical analysis cannot distinguish between injurious and harmless organic matter in water—it is undoubtedly to a great extent true. Moreover, it is obvious that there must be a limit to the minuteness of the quantities that can be determined. No merely chemical process could, of course, be expected to determine whether the albuminoid matter, if any, is living or dead; or whether, if living, the organisms are hurtful or harmless. In comparing, for instance, typhoid stools with healthy stools as regards water pollution, we must not look for critical differences in the amount of nitrogen or carbon present, or of ammonia produced by destructive treatment; but rather, if a chemical difference is to be sought for, by direct experiment we must attempt to isolate some principle characteristic of one or the other. A given weight of enteric stool is dangerous as regards enteric fever, in proportion to the amount of infectious matter in it, whatever that may be; but the chemist should only report, and should only profess to report, on the quantity or proportion of organic impurity, be it noxious or not.

But while analysis cannot tell us of *specific* pollution, it can tell us that a water is *polluted*, and that such a water ought to be condemned. Where even 'innocent' pollution, if there be such a thing, has occurred, specific pollution *may* occur; and, apart from this, putrefaction may render it hurtful even without the presence of any specific poison. The æsthetic side of the question may, perhaps, also be considered. Drinking a sewage-mixture, more or less strong, may possibly for a time, and under favourable circumstances, be harmless, but it is not a habit which commends itself to the taste of ordinary persons.

The objection that a quantity of specific poison

* Dr. Buchanan

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too minute for detection by analysis may still be able to produce its specific effect, cannot, of course, be denied. In such cases, if they ever occur, there is but one course open, at least in the present state of our knowledge. We must 'go beyond the laboratory,' at any rate beyond the ordinary laboratory, and perform a physiological test. *Fiat experimentum in corpore vili.* A typhoid 'germ,' if such things exist, would probably be, so far as the analyst is concerned, merely an extremely minute fragment of albuminous matter. Even in large numbers, therefore, these 'germs' *may* be too minute to be detected by chemical reagents; but, as a matter of fact, practically no cases occur in which the poison is present without much more than enough concomitant organic filth to allow of the pollution being detected, or without evident and unmistakable signs of pollution past or future such as are afforded by the estimation of oxidised nitrogen; and it needs no sacrifice of our faith in water analysis to admit its inability to cope with those possible, though most improbable, cases in which such excess of organic matter, or such other signs of danger, are absent. It would surely be absurd to maintain that an army is useless because we can conceive of its being defeated under certain excessively unlikely conditions.

Such extraordinary accidents as that which caused the Caterham outbreak must necessarily be extremely rare; but that particular case is, however, eagerly seized upon as an actual instance in which the circumstances were such as to preclude the possibility of detecting, by means of water analysis, the impurities which produced the disease. The conclusions which appear generally to be drawn from the history of that case—so thoroughly and ably investigated by Dr. Thorne Thorne—are not always perfectly valid. In the report of the Medical Officer to the Local Government Board for 1881-82 the following passage occurs:—

'In an outbreak of enteric fever at Caterham two years ago, nearly 200 earlier attacks were traced, upon evidence that did not admit of question, to the use throughout a particular fortnight of water that had been pumped from a well in which a man having enteric fever had been at work. Some excremental matters from him had by accident got into the well. Now I learn, through the Chairman of Directors of the Caterham Waterworks Company, that 1,861,000 gallons of water were pumped from the well during the fortnight. If the water had for the whole fortnight contained one grain of excremental matter per gallon, this would have meant that 19 lbs. of excrement had been added to each day's supply of water. It is, of course, out of the question that the man evacuated any such quantity; neither is there any reason to suppose that every gallon received the same amount of contaminating matter; but the story may serve to show that, in speaking of one grain in the gallon, we speak of a very large amount of polluting matter present in the water. It may be thought of as an amount not likely to have been exceeded in the particular samples of Caterham water that did actually produce disease in the individuals who drank it.'

'In Dr. Cory's experiments, then, with one grain of enteric fever-stool per gallon, we see a water thus largely befouled by a most dangerous material; and the indication of that befoulment, when expressed by the chemist in terms of albuminoid ammonia, is the figure ·014 part per million parts of water. Therefore it is not permissible to accept the doctrines which have been formulated from the amount of albuminoid ammonia present in an otherwise unknown water. Polluting material, potent for harm, may be present in a water "yielding from ·00 up to ·05 parts of albuminoid ammonia per million," without removing it from the rank of waters of "extraordinary organic purity;" and we assuredly have no evidence, in the case of an unknown water showing from ·05 to ·10 parts of albuminoid ammonia per million, that it is safe organically.'

With some of the objections raised in this passage we have already partially dealt. It is stated that there is no reason to suppose that every gallon received the same amount of contaminating matter. This certainly is an argument that cuts both ways. Considering recent observations as to the part that *quantity* of poison seems to play in producing enteric fever, on this ground alone there seems to us good reason to believe that some gallons of the water contained very much more than *one* grain of contaminating matter. There is no reason to suppose that the polluting material was equally diffused through the 1,861,000 gallons of water. There is every reason to suppose the contrary, and that in 'the particular samples of water that did actually produce disease,' the one grain per gallon of impurity is decidedly likely to have been exceeded, and probably very largely exceeded. Again, to speak of one grain of enteric fever *stool* per gallon as constituting a 'large befoulment' seems to us to be by no means admissible. A water contaminated to this extent may be dangerously contaminated, but certainly not largely, so far as actual amount of organic matter is concerned. Supposing that the small total amount of poisonous matter had been equally diffused through the Company's reservoir, it would, of course, have been absurd to expect to discover its presence by analysing a sample of water from the reservoir; and in the absence of analyses of '*the particular samples* of water that did actually produce disease,' we venture respectfully to submit that the history of the Caterham case does not in the slightest degree detract from the value of water analyses for sanitary purposes.

(*To be continued.*)

INSPECTION OF FURNISHED ROOMS IN PARIS.—The Police Department of Paris has, at the request of the Municipal Council, instituted a service of inspection of furnished lodgings. Five regular inspectors and four substitutes have been appointed. Each inspector must, on application, furnish a report upon the healthfulness of any lodging within forty-eight hours after the application is received. It is not stated whether the inspectors are medical men or not.

CANAL BOATS ACT (1877) AMENDMENT BILL.—The main provisions of this Bill are that the registration of canal boats shall be annual, that boats with sleeping or cooking accommodation are to be deemed dwellings, and that no child under the age of thirteen who has not passed the third education standard shall be employed in a canal boat. Other clauses provide special means for the enforcement of these provisions.

DISUSED BURIAL GROUNDS.—A short Bill to prevent the erection of dwellings on disused burial grounds has been brought in by Mr. Hollond, Mr. Bryce, and Mr. Peek. After the passing of the Bill no buildings are to be erected on any disused burial ground, except for the purpose of enlarging a church, without the previous licence of the Secretary of State, whose licence shall not authorise the removal of any body or bodies interred in the disused ground.

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WATER RATES.

By J. VESEY FITZGERALD, Barrister-at-Law.

PUBLIC interest in the question of charges for water appears to increase rather than diminish. When Mr. Dobbs obtained the judgment of the House of Lords in his favour, many people apparently thought that a death-blow had been given to the high charges made by the water companies, and expected for the future to find their water bills reduced to small proportions. Those who raised their hopes too high have been disappointed, and have now discovered that the House of Lords have not entirely settled the question of water rates in favour of the consumer. The judgment in Dobbs's case is no doubt most important, inasmuch as it settles the basis on which water rates are to be charged, and settles it on a lower scale than that which was contended for by the companies. The law peers, in their judgments, have decided that the real annual value of premises is their value after deducting the necessary burdens upon them, or, in other words, is the rent payable in respect of them, 'after deducting the average annual cost of the repairs, insurance, and other expenses, necessary to maintain them in a state to command such rent.' But the case in no way challenged the right of the companies to charge on the basis of the rent or annual value as so defined, and so to make varying and increasing charges for the same supply of water to the same premises.

The particular charges which may be made for water supply are determined usually by the private Acts of Parliament in force in each district. The metropolis, and all our large towns and many rural districts, are supplied with water from waterworks which have been constructed under the authority of Acts of Parliament. The chief public Acts bearing on the question are the Waterworks Clauses Acts, 1847 & 1863, and the Public Health Acts, 1875 & 1878; but besides these there are some hundreds of private Acts, under which the water companies, and in some cases the corporations of towns, have special powers, or are under special liabilities, with respect to the water supply of their districts. The terms of these private Acts vary greatly, as the supposed needs of the particular district, and to some extent the date when the Act was obtained, have influenced Parliament in determining what powers were to be granted; but in almost all of them the principle of payment for water is the same as the principle authorised by the public Acts already mentioned, namely, that of charging a percentage on the rent or annual value of the premises supplied.

By their private Acts and by the Waterworks Clauses Acts purveyors of water are authorised to charge for the commodity they supply, not in accordance with its cost, or with the quantity taken by the consumer, but by means of a rate or charge based on the rent of the premises supplied. As was pointed out some years ago by Chief Justice Cockburn, the term 'water rate' is a misnomer. The principle on which rating is based is that a definite sum has to be raised in a district for public purposes, such as maintenance of the poor, or payment of police, or repair of highways, and this sum is apportioned rateably among the persons liable to contribute, so that each shall pay equally in proportion to his means. This apportionment has long been arrived at by basing the charge on the rent or annual value of the premises occupied or owned by the persons who have to pay, and by charging them all the same number of pence or shillings in the pound on such value so arrived at. For the purposes of rating, properly so called, as long as the assessments on all the premises in a district are based on the same scale, it does not matter whether they are accurate or not, for the total sum to be raised, and the contributions of each individual ratepayer remain the same, whether the value of the premises be fixed too high or too low. But the so-called water rates, though charged like rates proper on the value of the premises, are not charged for the purpose of raising a given sum necessary for defraying the expenses of bringing water into the district. A water company or a corporation supplying water makes no estimate of the cost of the water supply, and makes no attempt to apportion that cost among the occupiers of the premises supplied. They are authorised by Act of Parliament to make charges not exceeding a specified scale; and, in case of a company, it is the interest of the officials to exact the full amount authorised. It was some years ago decided by the Court of Appeal that corporations who supply water have no right to charge water rates on such a scale as to make a profit, but only such rates as will defray the necessary expenses of the water supply. In many towns no doubt a profit is still made out of water rates, which goes towards the general expenses of the town; but such profits are illegal, and, where the corporation supply the water, the tendency to screw water rates up to the highest point is kept in check. But a company having Parliamentary powers to supply water in a district has every inducement to charge the maximum rates that are permissible. It was formed as a commercial speculation, and the shareholders naturally want a dividend, and the higher it is the better they are satisfied with the management. Most companies are limited by their Acts to a maximum dividend; but few of them have yet been put under the restrictions as to issue of new capital which have been imposed by Parliament upon gas companies, and the shareholders are consequently able to secure a bonus in addition to their maximum dividend, whenever new shares are allotted. Besides this, a large income can be profitably expended in improving the works and plant of the concern, and so in improving its capital value, and in some cases a surplus has also been employed in paying back dividends for years in which they have fallen short of the authorised maximum. Companies have every inducement for the present to raise their prices and their revenue as high as possible, and they have no reason to keep them down by the fear of raising up competitors to undersell them or of driving away their customers by exorbitant prices. They practically possess a monopoly of the water supply of their districts, and no one else can enter the field against them without first obtaining Parliamentary powers for the purpose. As long as they can supply enough water that is not too palpably impure they need fear no rivals, and the householders must take and pay for their water, although they may grumble at its quality and its price. The consumer can only look forward to the time when his district shall be supplied with water, as it is supplied with sewers and with other necessaries of civilised existence, at the expense of the community; or else to an alteration of the terms on which those, who for their own profit, undertake the business of water supply shall be allowed to charge him for the supply they give.

Existing companies can afford to look with equanimity on all proposals to substitute the community

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or the governing body of the district for themselves, as the body which is to undertake their business, and receive the water rates. Such bodies can only supplant them by purchasing their works and their whole undertaking, and can only make the purchase on terms which are most advantageous to the company. Judging by the experience of those towns which have already purchased their waterworks, the price to be paid is considerably in excess of the real value of what is purchased; and the shareholders in the water companies are usually able to change their dividends for a secured income, at least as great as the one which they have been receiving. After the purchases, water rates have to be charged so as to cover not only the expenses of water supply and management, but also the interest on the fancy price paid for the waterworks, and are thus in excess of what they ought legitimately to be. But, though the terms of purchase are thus almost always unduly favourable to the companies, and in proportion unfavourable to the ratepayer, still they are better for him than a continuance under the previous system, because the perpetual increase of water rates with the increase in the value of house property is checked when the community, who may not make profits out of water, are substituted for the company whose only object is to make them.

The other alternative by which the oppressive charges of the water companies may be alleviated is to be found in an alteration of their legal power of charging, such as is proposed by the Bill which the Corporation of London are this year promoting. The unfairness of the present system of charging according to the value of premises is nowhere more apparent than in the City of London, where the most valuable premises are used for business purposes only, and the resident population is small. In many cases the rateable value is tenfold what it was at the time when the water companies obtained Parliamentary sanction for their scale of charges, and the income which they derive from those premises is at least ten times what the companies and Parliament considered to be fair, but the water supplied for those increased rents is probably less in quantity than it was then, so that the profits derived from supplying the City have increased even in greater proportion than the rates. The Bill proposes, subject to certain restrictions, to allow the consumers to take their water by measure, and pay only for the quantity they use, and not in accordance with the business value of their premises. The directors of the companies and other interested persons assert that such a change will be unfair, because it proposes to deprive the companies of the income which they enjoy under the mode of charging now authorised by Parliament; and the advocates of the proposed change retort that the unfairness is all on the side of the existing law, under which householders are charged out of all proportion to the quantity of water supplied to them. Both assertions are to some extent well founded; and it is the business of Parliament, after hearing what can be said on both sides, to see that the Bill, if it passes into law, is so worded as to do justice to all concerned. Another objection which is urged against the Bill, is that under it the poorer classes will be tempted not to use enough water, and that cleanliness and the due flushing of drains will be neglected. If this objection were well founded it would be fatal. It is undoubtedly of vital importance to the well-being of the community and of every member of it that the supply of water in a district should be ample, and should be available for every one. Houses where the inhabitants do not wash become a nuisance, and very possibly a source of infection, injurious to the health of the neighbourhood, and detrimental to the value of the surrounding property. The principle of water rates was adopted through recognition of this, as it was thought, and rightly, that the wealthier members of the community derived a benefit not only from the water consumed on their own premises, but from the fact that their neighbours had a proper water supply available. Where water rates are charged by a body which makes no profit out of them, this principle of charging rates for the water supply is as good as any that can be devised; because payment by meter undoubtedly has a tendency to check the consumption of water, while the system of payment by rates offers no inducement to abstain from using the water supplied. The Corporation Bill proposes to obviate this tendency by allowing a certain consumption before the charge by meter begins, and here, again, it will be necessary to see that the consumption so allowed is sufficient. If the Bill is so framed as not unduly to interfere with the vested interests of the companies, and not to shift the expense of that portion of the water supply which is really a matter of public concern, from those who can afford to pay for it to those who cannot, the changes which it proposes will be for the general good. But if it is merely a Bill for relieving householders of some portion of the water rates which they now are liable to pay, by indirectly diminishing the amount of water used in the metropolis, the relief to the householder will be too dearly obtained. We believe that the promoters of the Bill are anxious to avoid such a result, and have framed it so as at any rate to avoid checking the consumption of water. It is an attempt to put an end to a system of charging, which, though fair enough when the charges are made by a public body acting on behalf of the public, has been found to be capable of being worked oppressively by private bodies acting for their own profit. It will, if adopted, put an end to the steady growth of their charges, which has emboldened the London companies to demand for their waterworks such prices as the public have hitherto been afraid to pay, and which seemed likely to make those prices even higher in the future, and will thus make it appear less impossible than it has hitherto seemed, for London to follow the example of other large towns, and undertake the responsibility of its own water supply. Till this is done the householders will have to pay, in some shape or other, excessive prices for water; and even afterwards the prices must always be high as compared with those charged in other towns where the cost of the waterworks has been less than their cost must be in the metropolis.

THE Burnham Board of Health have resolved to call in the services of a skilled engineer to advise them how they could best supply the town with an abundant and wholesome supply of water to meet the requirements of the Local Government Board.

MESSRS. GRIFFITHS, BERDOE, & Co. (The Sanitary Paint Company, Limited) have received a telegram announcing that they have been awarded a gold medal at the Calcutta Exhibition for their Griffiths' patent white, enamel, and other paints, colours, varnishes, &c. Messrs. Griffiths' various and excellent manufactures will be on show at the Building Exhibition, to be held at the Agricultural Hall in March and April, at 35 Avenue B and 80 Avenue C.

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PUBLIC WASHHOUSES, LAUNDRIES, AND SWIMMING BATHS.

By LORD BRABAZON.*

AMONG many other social wants of London may be reckoned the absence of an adequate supply of public washhouses, laundries, and swimming baths, and I am bold enough to assert that these social wants are of such primary necessity to the health of the people that they should be provided for out of public or municipal funds. Although the proposition hat 'cleanliness is next to godliness' is not, as many suppose, to be found in Holy Writ, I believe that it contains a considerable element of truth, and that there is a close connection between cleanliness and the cultivation of the civic and social virtues. At all events, the converse of this proposition—namely, that dirt is closely allied to ungodliness, general disorder, and human wretchedness—must be apparent to all, and requires no demonstration. The upper and middle classes of England believe in the gospel of cleanliness, and practise it both in their homes and in their persons. The rich Englishman considers it necessary to his health that he should daily cleanse his body with water, or, at all events, that he should not allow many days to elapse without doing so; but I would ask my readers how many families of the working classes live up to a similar high standard of cleanliness. Some of us are in the habit of talking of the 'great unwashed,' but have the wealthier classes of this country ever asked themselves whether, if they were suddenly placed in conditions similar to those in which the poorer live, they would for long be able to retain their habits of cleanliness? Consider the conditions adverse to this virtue under which the poorer classes live, and how little has been done to encourage or make possible these desirable habits. Consider how confined are their dwellings, the number inhabiting each room, the impossibility of obtaining privacy, the limited water supply, the wear and tear upon clothing, the dirty and often filthy nature of their employments, the limited wardrobe, the smoky atmosphere in which their dwellings are often situated, and the utter neglect by the nation at large of all opportunities of assisting them in their efforts towards cleanliness. That the working classes in many cases rise superior to all these hindrances and impediments, and that many homes in districts the most unfavourable to cleanliness are models of perfection, is no argument in favour of leaving matters *in statu quo*, though it is a strong argument for modesty on the part of those who, while more happily circumstanced, find fault with the unwashed, and yet take no step to render cleanliness possible to them.

Owing to the want of proper accommodation for the washing and drying of clothes in working-class houses, these disagreeable operations have to be carried on in the dwelling and sleeping apartments of the inmates. Is it astonishing if the husband and sons take refuge from the scene of discomfort in the nearest public-house, and if the frequent cleansing of clothes be voted a nuisance in the family, and the use of soap and water when applied to garments be associated in their minds with damp linen, steaming clothes, general discomfort, and rheumatism? What a different aspect would the washing of clothes present to the husband's mind if the operation did not necessitate the upsetting of all domestic comfort, if it were carried on out of sight in a public laundry belonging to the parish, to which his wife would in turn with her neighbours have the right of access for a certain number of hours on payment of a small fee!

When we pass from the consideration of washhouses and laundries to that of swimming baths, it may be said that while the former may be considered necessities the latter are decidedly luxuries. I decline to accede to this proposition. Healthy exercise is necessary to the proper physical development of the people, and the nation which neglects the physical condition of its people is not only doomed to destruction, but richly deserves the national effacement which is certain to overtake it. I do not ask that the people shall be admitted free to any of these institutions, but only that they shall be placed in their midst, and that the payment shall be made so low as to enable the population to make large use of them. The vestry of Paddington has actually built a swimming bath and gymnasium out of public funds, and as a ratepayer in the parish I heartily approve of their conduct. I believe also that other vestries have acted in a similarly enlightened manner. Whatever may be said with regard to the duty of the nation to provide means of healthy recreation for adults, I believe that most people would agree that the physical development of children should not be left to chance, and will rejoice that the School Board of London has recognised the importance of teaching its scholars the art of swimming, and that prizes are annually offered for competition among those who have obtained the greatest proficiency in this useful and healthy exercise. Unfortunately comparatively few of the children are able to learn to swim, as in many districts it is impossible to teach this art owing to the absence of any bathing-places. How eagerly the children of the metropolis avail themselves of the scanty opportunities for bathing which the police regulations allow them is shown by the hundreds who may be seen of a summer evening waiting on the banks of the Serpentine expectant of the signal which will permit them to plunge into its waters. Why should not every parish follow the example of Paddington? If one parish can do it, others could. The ruins of Rome and Pompeii attest the importance which the ancients attached to the provision of public baths for the people. Why should we with our higher civilisation, and with our enormous aggregations of population within crowded areas, from whence Nature with her streams and lakes has been driven, fail to do what the ancients in their small, village-like towns, and with their comparatively imperfect water supply, considered necessary for the health of the people? We have at our doors the most magnificent natural swimming bath running for miles through the very heart of the city, and yet how little use is made of it! I am not aware of more than one floating bath in the whole course of the Thames through London, whereas in Paris there are several on the Seine. Why should not floating public swimming baths for both sexes be established by scores from Greenwich to Putney? Why should not washing establishments such as are to be seen on the Seine be likewise erected, both paid for and managed by the municipal authorities? These floating baths and washhouses would cost but little in their erection, and their maintenance would be a mere trifle when compared with the sums which are thrown away by corporations and vestries on much less profitable

* Abridged from the *Pall Mall Gazette*.

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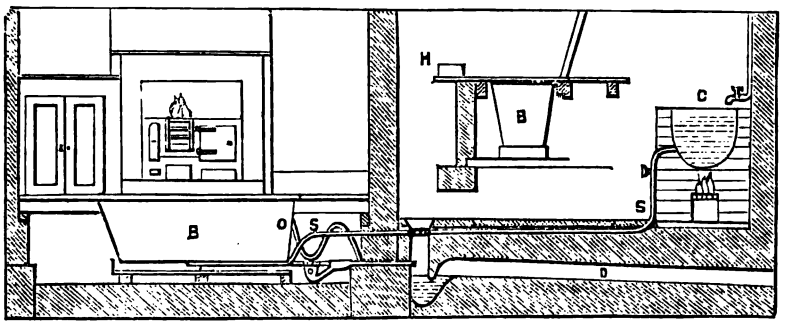
objects. I see the political economist rise in indignation at the proposal. And yet it is not supposed to be iniquitous for the nation to pay for the free opening to the people of a National Gallery, nor when the least admirable portion of the plebs has drunk itself into penury is it thought to savour of Communism if the prudent and respectable portion of society be compelled by the State to support the former in workhouses. The preservation of the health of the people is, in my opinion, the first duty of the State; and by the erection in towns of public washhouses, laundries, and swimming baths, an important step would without doubt be taken towards improving the health and increasing the happiness of our city populations.

A correspondent of the *Pall Mall Gazette* writes in reference to this article: 'Lord Brabazon's letter in your columns on the necessity of providing public laundries and baths for the poorer classes of London will astonish our neighbours on the opposite shores of La Manche not a little. We English plume ourselves on our national love of cleanliness, and the Britannic portwore the cleanly blue blouse, how could he get it constantly washed and dried?'

A working engineer sends to our admirably conducted contemporary the following useful hints to ingenious artisans:—Perhaps it may interest people who are anxious to improve the dwellings of working men to know how a bath may be fitted in such houses at trifling cost. The scarcity of baths in this class of houses goes without saying. Even the most 'model' of dwellings do not possess them. In placing one in a house such as workmen live in, space and expense must be saved or it will not pay the 5 per cent. of philanthropy. A bath-room is out of the question where space is so valuable; as the rents must be low, high-pressure boilers and special cisterns are inadmissible, because the outlay would not bear interest; and as working-men tenants are sometimes rough in their use of such conveniences, the fittings must be strong and simple. The problem of how to fit a bath in a house without diminishing the space, how to heat it without special apparatus, and how to make it so strong and simple that it cannot get out of order, and yet be inexpensive, has been solved by a mechanic in his own cottage, and in this letter I wish to show how it is done. A tin bath, 5 feet

KITCHEN. SCULLERY. (Cross Section).



B, Bath. C, Copper. D, Drain. H, Hearth. S, Supply. O, Overflow. W, Waste.

able tourist's bath, so familiar now to French eyes, has given an impression quite the reverse of the truth. The fact of the matter is, France is far ahead of us in providing for the wants of the people in this respect. Take the town of Dijon, for instance, and the same holds good of quite small towns. Here a workman gets an admirable bath for two sous (one penny), the price of the first-class bath being sixpence. In towns, small or large, standing on a river you find swimming-baths, in some cases gratuitous, in others a nominal charge being made. As an example of this I mention the numerous little towns and villages on the banks of the Marne, not far from Paris, Pouilly, Lagny, &c. I write this from a fashionable English watering-place on the south coast, where cleanliness, like other good things, is the monopoly of the rich. We have the sea, it is true, but a workman who should desire a dip without the means of paying ninepence would have to take it before daybreak, and in the winter there is no resource open to him but the swimming-bath, for which a shilling is the lowest charge. The public laundries and drying-grounds, moreover, found all over France are great conducives to personal cleanliness. French manufacturers will tell you that in some cases their workmen refuse to work with English artisans on account of the evil odour of their clothes. But if an English artisan at home

6 inches long, 1 foot 9 inches deep, and 1 foot 6 inches wide is let through a hole cut in the kitchen floor under the hearth-rug. Its bottom rests in a wooden tray of sawdust 3 inches deep, which in turn rests on three pieces of wood laid on the soil. The piece of floor cut out makes a trap-door and covers the bath. When the hearthrug is down the room is just as large as it was before, which satisfies the first condition of taking up no space. It is supplied by water from the scullery-copper by a pipe from the side of the copper under the floor to the bath. The copper is supplied by a tap directly from the house-cistern. Cold water is first run into the bath; the copper is then filled up, the water boiled, and sent by the same pipe into the bath: therefore no special appliance is necessary for heating it. The waste water is let out by a cock worked by a rod through the floor, the pipe discharging over the open side of the syphon in the sink outside. The overflow is connected to the same pipe. The sketch shows the arrangement. There is only one cock to the bath, and one to the copper; both of the common plug type, so that they are simple and strong. No sewer gas can enter the house through the bath. The total cost was under 2*l*. The bath was bought cheap, and the mechanic gave all the labour, except that of a plumber for seven hours. In ordinary

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cases it ought not to cost more than 5*l.*, so that it is inexpensive. It costs about 1½*d.* for coals to heat it. It is an enormous improvement on the primitive pail or washing-tub, and the inconvenience is small compared with the advantages.

BATHS AND BATHING.

By E. F. WILLOUGHBY, M.B.

IN the East the hot-air bath has always been popular, and in Turkey especially it holds its ground to the present day. In Constantinople there are no fewer than 400 of these baths—from the brilliant Hammams with their Moorish architecture and gorgeous colouring, shady gardens, sparkling fountains and rich carpets, down to the humble sweating room of more than doubtful cleanliness; but swimming baths and gymnasia are nowhere to be seen.

Quite other has been the development of the bath in Russia. The pleasures of the luxurious Roman or indolent Turk would be felt as insipid by the rude Muscovite, inured to frost and snow and to strong drink. He revels in the dense vapour produced by pouring water on hot bricks until he is well-nigh stifled, when he plunges into a tank of icy coldness, repeating the operation until he feels lightened and invigorated. In Finland, Sweden and Norway, the same combination of vapour and cold plunge-bath prevails; but it has not established itself in Western Europe, except as a purely therapeutic agency.

To England is due the credit in recent times of turning attention to the healthful pleasures of the bath. Not only are few houses of the better class now without a bath-room serving for personal cleanliness, but public swimming baths have been opened in almost all large towns. The so-called Turkish, or more correctly, the Roman bath, was revived or introduced by Dr. Barther, at St. Ann's Hill, near Cork, in 1856, and is, on that account, known in Germany as the Roman Irish, and has been rapidly extended through this country and the Continent. In Hungary and in Vienna these baths vie in oriental splendour with those of Constantinople itself. France and the adjacent countries have not made the same progress as Great Britain and Germany in the art of bathing; indeed, except in Paris and Brussels, the swimming-bath, without which all other arrangements are incomplete, is almost everywhere absent.

In Germany the public baths are perhaps more elaborate and complete in every department, and on a larger scale than anywhere else, special attention being paid to the gymnastic aspect, of which Dr. Heusner is the most prominent advocate. He rightly urges the value of swimming as an exercise for women even more than for men since, as he observes, the muscles of the spinal column are entirely relieved by the support of the water, while those of the limbs and thorax and even the abdomen are brought into active play. He considers it to be incomparably the best preventative of that nervous irritability, '*nervosität*,' to which women of the higher classes are at present so prone, as well as of the tendency to asymmetry, consequent on want of muscular development.

In the principal towns of Germany public baths have been opened or are in course of erection, in which every description—swimming and smaller tanks, private baths, Turkish, Russian, douche, spray, &c., are brought together, on a scale of magnitude and completeness not to be seen elsewhere. Here in England the swimming-bath is the favourite institution, and comparatively few of the Turkish baths are what they should be in the matters of ventilation, &c. The cold tank in them is rarely large enough to allow of swimming, while swimming baths are devoted to that purpose only.

Glasgow in this respect has set a noble example, the Victoria Bath Company in that town having not only one of the largest swimming baths in the country, but attached to it capacious Turkish and other baths, and—the only revival of the Roman practice—a gymnasium. The hygienic value of this triple association cannot be over-estimated.

Among German cities, Cologne—'the metropolis of the Rhineland,' as it is called—has hitherto been without any such establishment; but the Bade-anstalt, now begun, will be one of the most complete and largest on the Continent, comprising every description of bath, from the luxurious saloon to the workman's swimming bath, the charge for which will be little over a penny, though the supply of water will be *continuous*; and men following dirty employments be compelled to perform a preliminary ablution with soap. Such an arrangement, even more necessary where a constant supply of fresh water is not to be had, would doubtless render our third-class public baths more popular with those of the poorer classes who value cleanliness, and object to what is known amongst them as 'soup.'

Plans, estimates, and full description of these magnificent baths may be seen in the *Centralblatt für Allgemeine Gesundheitspflege*, 2te Jahre, Heft 7 and 8, in an address delivered by Mr. J. Stübben, the city architect of Cologne, after whose designs they are being erected.

INHABITED HOUSE DUTY.—The Bill to amend the law regulating the duty on inhabited houses has been brought in by Sir H. Drummond-Wolff, Lord A. Percy. and other members, and is intended to place lodging-houses on the same footing as shops, hotels, and farmhouses, which pay an inhabited house duty of 6*d.* in the pound instead of 9*d.*, which they now pay like private houses.

LEAD-POISONING.—An inquest has been held at the Police Court, Jarrow, on the body of Mary West, 39 years of age. The deceased had only been employed for a short time at Messrs. Foster, Blackett, Wilson, & Co.'s Lead Works. She was taken ill on the 8th, and died on the 18th, from chronic lead-poisoning the medical evidence plainly showed. The inquest was adjourned to allow an inspection of the works by the official inspector, who reported that he found nothing to find fault with, every reasonable precaution being taken for the protection of the lead-workers, this being one of the best-regulated factories in the district. It appeared that the deceased was one of those persons who are peculiarly susceptible to the influence of lead-poisoning, and should not have been allowed to work in the factory. The verdict was in accordance with the evidence.

THE Blaydon Local Board, of which Colonel Cowen is chairman, has just completed two important sewage schemes; one section has been executed at Blaydon, and has involved the laying of 3,162 yards of sanitary pipes of various diameters, besides 76 yards of brick outfall sewers. The other section has been executed in the neighbouring village of Winlaton, and consisted of 5,495 yards of pipes, with the necessary requirements of manholes, gutters, &c. About 100 houses which were previously without privy accommodation have been supplied by the owners at the request of the board, and many other desirable sanitary improvements have also been effected under the supervision of the board.

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THE HOUSING OF THE POOR IN BIRMINGHAM AND THE BLACK COUNTRY.

(FROM OUR OWN CORRESPONDENT.)

[*Third Article.*]

THE Artisans' Dwellings Committee, appointed by the Birmingham Corporation to investigate the condition of the poorer class of houses in the borough, are still prosecuting their labours in a vigorous and exhaustive manner, though what is to come of the inquiry does not appear to be at all clearly defined. The condition of affairs in some of the districts has been found to be most deplorable, in respect both to overcrowding and insanitary conditions. A few extracts from the evidence taken and reports made will suffice to show how great was the necessity for action, and how grievous a state of things may exist in a large town, unheeded, if not absolutely unknown, until some extraordinary circumstance attracts attention to it.

Dr. Alfred Hill, the Medical Officer of Health, reported, in reference to St. Stephen's Ward, that at one house the floor of the kitchen had fallen into the cellar. The people had been turned out because they could not pay the rent, but had gone back unknown to the landlord. There were 294 empty houses in the ward, many of which were suited for artisans' dwellings, and let at rents varying from 1*s.* to 2*s.* 4*d.* per week. In one house one bedroom was occupied by three persons, the other bedroom by pigeons. In a court was found a manure-heap resting against a house, as high as the roof, and fifteen yards long. The people were, as a matter of course, very dirty, and the conditions insanitary. The floors of the houses in the street into which the court opened were said not to have been swept or washed for years. In some places the landlords had done nothing to the buildings for several years. Under such circumstances, there is little need to wonder at the unwholesome smells emanating from such places, or at the demoralising effect produced upon the inhabitants. Mr. Alderman Jesse Collings, M.P., a member of the committee, sums up the position when he says :—'Evidence has been given that certain landlords have done nothing for from seven to fourteen years, and I think that people who live in property thus neglected are of necessity, and through no fault of their own, led into bad habits, and if they afterwards go into better houses they can hardly be blamed for a continuance of their habits. If it can be shown that any considerable amount of house accommodation is of a miserable character through the shortcomings of the landlords or their agents, the initial fault will be soon detected. Everybody who lets a house, or has a house to let, should keep it in a proper condition, and should be treated in the same way as a man who exposes bad meat for sale, or sells adulterated milk.' One great difficulty the committee has met with arises from the fact that a great deal of the poorer property is held on short leases, and where the lease has nearly expired it is impossible to find the responsible person to make the necessary alterations and repairs. As the Town Clerk remarked, 'The last man is afraid of having to pay for the faults of a great many preceding owners.' In Duddeston Ward Dr. Hill reported 283 empty houses, generally in good condition. This is one of the best wards in the borough, though many of the houses are very dirty, and have had nothing done to them in the shape of limewashing for from six to ten years. St. Mary's Ward has come in for a great deal of condemnation. It contains about 5,000 houses, of which the corporation own 709. There are over 400 empty houses in the ward, of which a number, belonging to the corporation, will not be again let, as they form part of an improvement scheme.

A large number of the tenants had been turned out because they used the houses as brothels, and the places remained empty on account of the difficulty experienced in getting respectable people to occupy them. The houses belonging to the corporation which it is proposed to let again, are being put into proper repair. Respecting the sanitary condition of this ward, Mr. Councillor Middlemore, a member of the committee, presented a report giving the result of his own inspection of the property. He states the condition of the houses to be due in a large measure to the jerry-builder and the speculative and neglectful landlord. As a consequence, most of the inhabitants of the ward were 'hovelled' rather than housed. He had seen the sky through the ceilings and walls of many bedrooms, and most of the staircases were built without banisters. Many of the bedrooms were so filthy and rancidly foul that continuous visits to them would make most people unwell. This was partly owing to the windows not being made to open. Overcrowding was very common. It frequently arose from poverty, but often also from the tenant's own inclination and convenience. In one house he found a bedroom occupied by a man, his wife, and eight children, the eldest of whom was twenty-eight years of age. There was also a case of a man and his wife living and sleeping in a kitchen, 10 feet by 8 feet in size, where also seven other individuals slept. The woman had been confined in the same room, but the child had died, according to her account, 'by the will of God and Dr. Jones.' The custom of taking in lodgers was very common, and he found several instances where the kitchen and the bedroom were occupied by separate families, while the attics, where such existed, were unused. In the course of his visit he found one or two unregistered lodging-houses, and in one that was registered he found from three to half a dozen married couples occupying one room. The rents of the houses varied from 1*s.* 6*d.* to 4*s.* 6*d.* per week, 2*s.* being the usual rent for a two-roomed, and 3*s.* to 3*s.* 6*d.* for a three-roomed, house. Tested by any legitimate and righteous standard there were whole streets of such houses which would stand condemned. Most of the property was so dilapidated that it had to be propped up to prevent it falling. The rooms seemed to vary in size from 8 feet square to 14 feet by 9 feet. There was a great deal of complaint about the difficulty experienced in getting the landlords to cleanse and whitewash the houses, and the corporation came in for a share of those complaints with regard to the houses belonging to them, and people had refused to live in those houses in consequence. Idleness and drunkenness appeared to be very prevalent. Dr. Hill, in his evidence relative to the same ward, said in one house ten persons slept in one room, allowing 110 cubic feet of air per head ; the property was in Chancery, and the people paid no rent. In a three-roomed house eight persons occupied one bedroom, allowing 131 cubic feet of air per head. The yards attached to these rooms were very narrow. In one case the privy was only 2 feet from the house door,

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and as it gave off a very bad effluvia it was decidedly unhealthy. With reference to another ward (Bordesley), Dr. Hill stated it to contain 805 empty houses, and described it as the 'theatre of jerry-building.' The wonder was that the property stood while it was being built. The end of one house was completely blown out during a recent gale, and was found to be only single-brick. The walls of the houses often bulged, rotten slates and iron nails were used for the roofs, the woodwork was of deal, and the mortar crumbled at the touch. In St. Bartholomew's Ward there were 343 empty houses. A great many of the dwellings were unfit for habitation, some being positively dangerous. Some could be made habitable, but a number required to be removed. They were crowded together, ill-ventilated, and excessively dark. Some of the property was old, and had been erected before there was any authority to control the builders. As a consequence, people seemed to have built as they liked. Houses were placed back to back in narrow courts, many of the walls were very damp, and the cubic space for each person varied from 113 ft. to 528 ft. In one court it averaged only 123 ft. per head. In one part of the ward sheds had been put up on gardens rented by squatters, who inhabited them. They were destitute of any but surface-drainage, had no water-supply, and the things the people used they had to steal, unless they could borrow them from the public-house where they got their beer. They all contained families, and the cubic space was only 110 ft. It was stated by a member of the committee that the demolition of these places had been ordered some time ago by the Health Committee, but the tenants represented how hard it would be for them to lose their growing crops, and the order was withdrawn. In a court in this ward the houses were so close together that when the window shutters are opened they touch the opposite wall. At the corner of Moor Street, in which thoroughfare the Police Court is situated, there is a wooden erection in a coalyard in which the owner sometimes sleeps, in close proximity to a horse, pig, goat, a number of fowls, and a manure heap. There are many three-roomed houses with a family in each room, and there are some six-roomed houses divided in the same way. Dr. Hill's evidence in respect to St. Paul's Ward showed there were 103 empty houses in it, of which 50 are totally unfit for habitation. Generally speaking, he found the cubic space in the wards was adequate, but there were exceptions. Much of the property was old and defective. There is no doubt that in some parts of Birmingham much poverty exists. But a great deal of it is preventable, caused in a large measure by drink, which leads to carelessness and neglect of cleanliness. In one district in the borough, notorious for its insanitary condition, there are 150 drink shops, the united takings of which cannot be less than 150,000*l.* per annum; in another district there are 120 public-houses, the annual takings of which it is estimated are 130,000*l.*; and in a third there are over 100, with estimated takings of 50,000*l.* a year. This is rightly considered to be an important factor, and one that should be taken into account in an inquiry of this description.

THE MUSIC CURE.—At the request of the chief medical officer of the military hospitals of Paris, a regimental band has been detailed to play at each of the three hospitals one day in the week for an hour.

COMMON LODGING-HOUSES IN THE BLACK COUNTRY.

THE appointment of an inspector of common lodging-houses in the borough of West Bromwich has resulted in a thorough overhauling of these places. And they proved to require it, being in a most filthy condition, with defective and insufficient sanitary arrangements, and a state of overcrowding which, happily, does not prevail in the other property of the borough to any noticeable extent. This state of things is entirely owing to neglect. Rules and regulations for the control of these common lodging-houses were made at the same time as the other by-laws for regulating the making of streets, the erection of houses, &c., in 1869, when the place was under the control of a Board of Improvement Commissioners. But no inspector was appointed to attend to the matter; consequently the regulations became a dead letter. Previous to 1869 these houses were regulated under the Towns Improvement Clauses Act of 1847, by virtue of which the superintendent of police for the district, in 1858, directed applications to be sent in by keepers of common lodging-houses to have them registered according to law. There were then five of these houses in the town. In two of them, three rooms were allotted to twenty-two persons; in another, a room, 15 feet by 14 feet and 8 feet high, had four beds in to accommodate eight persons. The smallest room of the lot was 13 feet by 10 feet, and accommodated four persons. No visitation of any of the houses appears to have been made since 1863. There are now seven of these places in the borough, but their condition, when the newly-appointed inspector took them in hand, was much worse than appears to have been the case at the time above referred to. There are also sixteen recognised brothels in the borough, thirteen of which are in one street, and some of these are among the oldest, worst constructed, and most insanitary dwellings West Bromwich contains. Seeing that the law requires the registration of any house where lodgers are taken in for hire for less than a week at a time, it is obvious that a number of these places can be brought within the same regulations, both as to sanitary condition and overcrowding, which apply to what are generally known as common lodging-houses. In Birmingham and Wolverhampton they have these places under control, and even in the much smaller town of Wednesbury, which adjoins West Bromwich, elaborate by-laws have long since been framed and placed in the hands of the inspector of nuisances to carry out, with the result that the seven lodging-houses in the town are in a most satisfactory condition. Three hundred cubic feet of space is there allowed for each inmate, and a partition is insisted upon between beds in the same room which are occupied by married couples. A personal inspection of the common lodging-houses in West Bromwich showed that in one the accommodation was contained in a group of very old tumble-down cottages, containing ten sleeping apartments in all, four being on the ground floor. As the by-laws do not allow of any basement room being used as a sleeping apartment, the latter will have to be taken out of use. The rooms contained two, three, and four beds, most of them being double. The average size of the rooms would be from 12 feet to 14 feet square. In some of them, when fully occupied, the cubic space per head would not reach much above 100 feet. There

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was no partition of any kind in any of the rooms, even where used by married couples. The total sleeping accommodation of this place, let out at *4d.* for single and *6d.* for double beds, was put down by the landlord at forty-two. The inspector, who proposes to allow a cubic space of about 280 feet per head, will reduce this number to at least one-third. In another house, in which also the landlord thought he could accommodate forty persons, there was a loft under the tiles of a gable roof, about 40 feet long by 15 feet wide, divided in the centre by a brick wall, with a square hole knocked through it to admit of communication. This place, having no means of ventilation but the open staircase and the interstices of the roof, which touched the floor on each side, was to sleep twenty persons, in ten beds. Needless to say, it will not be registered to accommodate one. As a means of letting his beds, which were rickety wooden bunks with scarce anything upon them in the shape of bedding, and what there was had not seen water for some time, the enterprising landlord proposed to reduce his charge to 2½*d.* per night. He will, perhaps, not now need to make such a sacrifice to his feelings, for he will not be registered to accommodate half the number he proposed. In a room of another house there were six double beds; and on the ground floor of another, in what was built to be used as a shop, were three double beds and a single one. In none of the houses were there any partitions between the beds, however many, in any one room. In at least one of the houses the landlord was not at all particular either whom he took in to lodge, or whom he put together into one room, and on the occasion of the visit in question, a friendless girl of fourteen was asleep in a double bed in a triple-bedded room, in which the landlord was not sure who would be the other occupants. It is high time some regulation was brought to bear upon these places, and the only wonder is that they have been allowed to go on so long unmolested.

THE death-rate of Newcastle still continues above the average of the twenty-eight large towns: 75 per cent. of the cases of zymotic disease reported to the medical officer of health are ascribed to scarlet fever.

MR. JUSTICE DENMAN, addressing the grand jury at Warwick assizes, said it had been a matter to him of earnest thought whether something further could not be done towards reducing the number of criminal offences by providing more comfortable dwellings for the poor, reducing intemperance, and providing places of rational amusement on holidays and Sabbaths.

THE memorial bust to the late Mr. William Spottiswoode, F.R.S., subscribed for by his numerous *employés*, was unveiled on the 15th ult. by Mr. George Eyre, senior partner of the firm of Eyre and Spottiswoode. The ceremony took place in the courtyard of her Majesty's Printing Office, East Harding Street, Fetter Lane, the bust being placed in an aperture above the entrance leading to the principal office.

THE Manchester Coffee Tavern Company appears to have prospered during the course of the past year. The cash sales have amounted to over 20,000*l.*, an increase of nearly 2,000*l.* upon the sum total of 1882. Another interesting feature of the business is that a modest bonus has been granted to the servants of the company. The sum is not large, but probably as large as it could safely be made, and the recognition of the principle is in any case a most excellent thing, and the Manchester Coffee Tavern Company are to be congratulated on having in this matter set a good example.

LABOURERS' DWELLINGS IN LIVERPOOL.

THE Liverpool Insanitary Property Committee, on November 12, 1883, instructed the city engineer, Mr. Clement Dunscombe, M.Inst.C.E., to report to the Committee, as to the best examples of buildings erected for the accommodation of the poorer classes at the lowest possible scale of rental, in blocks, and self-contained, such accommodation consisting of one, two, and three-roomed tenements; and to consider and report to the Committee, as to the advisability of endeavouring to remodel, or structurally alter or re-arrange insanitary property of the types with which the Committee have to deal in Liverpool (with plans showing his suggestion), so as to make them healthy dwellings at a moderate cost, and suitable for the housing of the population likely to be displaced; such proposals to be shown to the medical officer for his opinion prior to the submission to the Committee, and the engineer also to furnish an estimate of the cost and return to the Corporation for their outlay on the basis of a rental of 1*s.* per week per room.

Mr. Dunscombe has given in his report, of which we now reprint the substance, believing it to be likely to prove of practical utility to the many corporations and companies likely to erect similar structures. In it the engineer says, that having had occasion for some time past to carefully consider the important question of providing artisans' dwellings, and in so doing having personally inspected most of the dwellings erected previous to the preparation by him of the Nash Grove scheme now in progress, he is of opinion that where the necessities of the case require a large number of persons to be accommodated on a limited area the later buildings, erected by the Peabody trustees in various parts of the metropolis, and those now being erected for the Liverpool Corporation at Nash Grove are, perhaps, the best examples of dwellings in blocks erected and in course of erection. There are also numerous examples of self-contained flats in Liverpool and elsewhere, but many of them are capable of being considerably improved, both in their planning and internal detail.

Owing to many causes none of these dwellings approach a rental coming within the reach of the poorest labouring classes, who in large cities require to be housed near the centres of labour.

One of the latest examples, coming more nearly to the requirements of this class as to rental, are some dwellings in Holt Town, Manchester, erected under the auspices of the Manchester and Salford Working-men's Dwellings Company, Limited, from the designs of Mr. Lawrence Booth, F.R.I.B.A., Manchester, which may be described as detached three-storey block dwellings in flats consisting of two rooms each, let at 2*s.* 6*d.* per week. They are stated to have cost per flat 78*l.* exclusive of land.

The problem of providing healthy dwellings (with all requisite sanitary arrangements and appliances tending to promote cleanly and tidy habits) for the poorest classes in large cities, within easy reach of their work, on the basis of a rental of 1*s.* per room per week, is without doubt a most difficult one, and although in many instances it may be one beyond successful solution from a purely financial point of view, still the question is of such pressing importance that it is well worth all the time and attention

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that may be bestowed upon it in endeavouring to arrive at some practical solution.

In order to comply with the first portion of the Committee's resolution Mr. Dunscombe has prepared a series of designs for dwellings in blocks and self-contained cottage houses, based upon the lowest possible scale of rental, viz., 1*s.* per room per week.

These designs have been most carefully worked out as regards planning sanitary arrangements, and internal details; and they differ only from the better class of dwellings, either in blocks or self-contained, in their internal and external finish, which must of necessity be of the very plainest description.

Mr. Dunscombe has consulted with the medical officer of health, upon the various designs submitted, and acting on his advice he (Mr. Dunscombe) has arranged that in all the designs now put forward, where a single bedroom exists, not less than 1,000 feet cubical space is provided, and where a tenement consists of three rooms, the two bedrooms will respectively contain not less than 1,000 and 750 feet cubical space, while some of the single bedroomed tenements have a larger cubical space, in which case they are divided into two rooms by a screen, with the advantage of a separate entrance to each room.

All the tenements are provided with a separate water-closet, sink, water for domestic purposes laid on, a ventilated cupboard, coal bunker, and dust shoot. The general sanitary arrangements throughout are in every respect complete, and efficient means provided for ventilating the rooms throughout.

The buildings will be erected in common Liverpool brickwork, with common red brick arches to the entrance doors and front windows, quoins to doorways, and blue Staffordshire weathered and throated block sills in the case of the dwellings in blocks; the heads to openings of windows and balcony fronts will be executed in Portland cement concrete.

The internal walls will be finished as regards the living room with either a salt glazed or a red pressed brick dado, 3 ft. 6 in. in height, and above same finished in brickwork neatly pointed for lime whitening or distempering. The bedrooms will be finished in common brickwork, neatly pointed for distempering. The passages will be treated in a similar manner, and the stairs will be of stone or concrete. The windows provided throughout are of ample dimensions, and will be made to open the full area.

In the case of self-contained houses provision is made for getting access to the yard, which is common to each cottage, by a staircase in the rear external to the building. The water-closets are so placed as to be completely disconnected from the house by the intervening staircase landing, which admits a free circulation of air around the same. The several waste pipes from the houses or blocks will discharge external to the buildings, and with an end opening to the air over a trap, thus severing direct connection with the drain in the yard, which finally discharges into the sewer in the common passage. All the sewers will be thoroughly ventilated. The open space allotted to each cottage is divided from the adjoining open space by a low wall and iron railing, so as to afford ample ventilation and circulation of air throughout. In the case of dwellings in blocks they are so placed as to be detached, and the space surrounding each block is common thereto.

Adequate provision will be made for the collection and speedy removal of all refuse, and it is proposed that the yard spaces in every case and the streets upon which the dwellings abut shall be rendered thoroughly impervious, while full provision will be made for the surface water being rapidly discharged into the drains.

Mr. Dunscombe further remarks that where the necessities of the case do not require a large number of people to be housed on a limited area, self-contained houses, in flats two, or at most three, storeys high, so placed as to admit of a free circulation of air all around them, are, perhaps, the most suitable, and would be best appreciated by the labouring classes. If, however, it is necessary to provide for a large number of persons on a limited area, recourse must be had to dwellings in blocks several storeys in height, and although objections are often raised to this class of buildings as promoting undue surface overcrowdings, he points out that where all sanitary arrangements of such dwellings are carefully provided, through ventilation in the various storeys and a free circulation of air round the buildings generally secured, the surfaces of the streets and open spaces surrounding them rendered impervious, and all refuse quickly removed, it is possible on a limited area to house a dense population in such blocks under health conditions which bear favourable comparison with those existing in less crowded districts where the buildings and their surroundings do not reach so high a sanitary standard. In such dwellings in the metropolis where the number of inhabitants per acre reaches 1,200, the death-rate is considerably less than that of the whole metropolis where the number of inhabitants per acre is but 43.

As a matter indirectly bearing upon this question Mr. Dunscombe states that the custom at present largely prevails in Liverpool of erecting streets of four-roomed and six-roomed cottages, with an average floor space, per room, 9 feet in height, of 100 feet and 92 feet respectively, letting at average rentals of 5*s.* and 7*s.* per week, and he believes that much might be done to prevent overcrowding, and also to provide suitable dwellings for the poorer classes who do not require to be in close proximity to their work, by erecting self-contained four and six-roomed cottage houses in two flats, comprising on each flat self-contained tenements of two and three rooms, with all requisite sanitary arrangements complete, or a modification thereof, but finished internally in a similar manner to the four and six-roomed houses now generally erected.

Many persons who can ill afford the rental of a four or six-roomed house are often compelled to take either one or other, letting off some of the rooms to reduce the rent to what they can afford, and by so doing frequently create an overcrowding prejudicial to health, the only alternative being that they would have to take court houses. Self-contained cottages in flats, as proposed by Mr. Dunscombe, while obviating such a state of things, would afford a moderately profitable investment for private enterprise, while providing healthy dwellings at moderate rentals within the reach of this class.

The adaptation of many of the sub-let houses, which exist all over the city, into tenement dwellings in flats, provided with adequate sanitary arrangements, would also assist in solving this question.

The provision of improved dwellings for the poorest classes in large cities at rentals proportionate to their earnings cannot be discussed without connecting it with the general question of providing improved dwellings for the artisan and better paid

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labouring classes. When both are taken in conjunction the solution of the former question will be materially assisted.

According to the return of the inspector of nuisances there are at present in Liverpool 14,472 court houses, 88 per cent. of which are occupied, and by far the greater number of these will require to be dealt with as insanitary dwellings. The pressing question for solution is, therefore, how best to provide adequate accommodation for those displaced.

Mr. Dunscombe is of opinion that the carrying out of each of the following proposals simultaneously will best tend to solve this important question, viz.:—

1. The adaptation of the best existing court houses in selected districts. 2. The erection of labourers' dwellings in blocks, three and four storeys in height, to a limited extent in selected districts. 3. The erection of artisans' dwellings in blocks to a limited extent. 4. The adaptation of some of the sub-let houses into tenement dwellings in flats. 5. The erection of self-contained two and three-roomed tenements on the cottage principle.

The committee who dealt with this important question, in considering the class of artisans' dwellings, now being erected for the corporation on the Nash Grove site, were rightly actuated by a desire to provide in this instance dwellings of the best class, to be an example hereafter to be aimed at by future private enterprise, and such as would form a standard for dwellings for artisans of the better class in Liverpool, whose vocation necessitates their dwelling within easy reach of their daily work, but whose earnings are sufficient to enable them to pay the moderate rental fixed for the high class accommodation that will be afforded in the buildings now being erected.

The following is a short description of these dwellings. They consist of thirteen blocks of buildings five storeys in height, containing 272 tenements and twelve shops.

The tenements comprise—

85 .... 3 rooms
143 ..... 2 rooms
44 ..... 1 room (extra large),

the rentals being respectively 5*s.* 3*d.*, 4*s.* 3*d.*, and 2*s.* 9*d.* per week.

The superficial area of floor space per room, 9 feet in height, exclusive of laundries, sculleries, and other conveniences, is 150 feet.

The three-roomed tenements comprise a living room 13 feet 1 inch by 12 feet 4 inches, two bedrooms 13 feet 3 inches by 9 feet 7 inches and 13 feet 1 inch by 8 feet 6 inches respectively.

The two-roomed tenements comprise living room, 13 feet 1 inch by 12 feet 4 inches, and bedroom, 13 feet 3 inches by 9 feet 7 inches; and the single-roomed tenements comprise a combination living room and bedroom, 15 feet by 13 feet, with bed recess in same.

Each block will have a central stone staircase and corridors, from which the tenements will be approached. On every flat there will be provided a laundry, for the joint use of the tenements, also sculleries with sinks for each tenement, W.C.'s, dust shoot, &c.

Ventilated larders with coal bunkers under are provided in the tenements, and gas and water laid on. The sanitary arrangements are complete, and the buildings are being constructed in the most substantial manner on a foundation of Portland cement concrete over the entire area.

The buildings will be finished in Liverpool grey bricks, with red pressed brick and terra-cotta dressings, with main entrance to each block executed in terra-cotta.

FIFTY YEARS OF HOUSEHOLD SUFFRAGE IN BRADFORD, IN REFERENCE TO ITS SANITATION.*

By W. POLLARD BYLES.

(Editor of the *Bradford Observer*.)

We are accustomed in Bradford to think that the metropolis does not appreciate the magnitude and wealth of our town, yet Bradford is the eighth town in England, according to the census, and has gained its position solely by the energy of its inhabitants. Half a century ago the population was only 43,500. The administration of local affairs was then in the hands of police commissioners, whose supreme anxiety, like that of many local boards to-day, was how not to spend money. The streets were steep and narrow and dirty, the drainage was neglected, the lighting and watching were inadequate, and the recreation and comfort of the inhabitants were wholly unprovided for.

Leaping over the half-century which has since elapsed, what picture does Bradford present to-day? First of all, it is five times as large as it was then, the present population being estimated at 210,000, while close around it on all sides, and dependent on its trade, are busy villages with an aggregate population not much smaller. There is hardly a handsomer manufacturing town in the three kingdoms, and not a healthier one. There is none better lighted, or better supplied with water. Let me trace some of the steps by which the transformation has been brought about. As the methods of manufacture altered and the trade grew, the need of a freer and more elastic local government was felt, and in 1847 a charter of incorporation was obtained. From that day—that is to say, since its government was in the hands of the ratepayers—the town has advanced with long and rapid strides.

It may be worth while to glance at some of the most important undertakings in which the Bradford corporation has been engaged. Up to 1854 water was doled out by an old company on a scale miserable in quantity (only half a million gallons a day) and high in price. The corporation, after expensive parliamentary litigation, acquired the works of this company, the annual income of which was only 10,000*l.* That acquisition has been made the basis of a system of waterworks which have been of vital importance to the growth of the town. Water plentiful and good is a first necessity in some of the operations of worsted manufacture. The streams of the district being spoiled by refuse from the factories, it has been necessary to seek a pure source of supply among elevated lands far up the Worth valley beyond Haworth, and far up Wharfedale above Bolton Abbey. In these upland valleys the streams have been impounded, and are brought to

* Abridged from the *Pall Mall Gazette* of Feb. 13.

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the town by gravitation. Little by little has this waterworks system been extended and the number of reservoirs increased, until now the area supplied comprises twenty-eight townships besides th borough. The difficulties of distribution, too, over this district are great, for the levels vary nearly 1,000 ft. The magnitude of this vital municipal operation may be gathered from its cost, which has been over 2,000,000*l.*, and from its annual income, which, after paying working expenses, amounts to 73,000*l.* The daily supply is now 9,000,000 gallons, or eighteen times as much as in the olden days.

Equal spirit has been shown in the management of the gas supply. Until 1871 the gas was in the hands of a company which had grown too prosperous, if indeed it had not exceeded its legal dividend-paying powers. The corporation therefore pushed its inquiries very minutely into the company's affairs; and, having ascertained the vulnerable points, called for a transfer of the undertaking. This was resisted, and two Bills were introduced into Parliament—one for compulsorily enforcing a sale, and the other for authorising the municipal authority to construct works. At length the company capitulated on terms which were very liberal to its shareholders, but which have proved highly beneficial to the rate-payers, as may be gathered when I say that for several years following the purchase the ratepayers netted a profit of more than 30,000*l.* per annum, after paying all charges for interest and sinking fund. So satisfactory was the undertaking, that two years back the price of the gas (which is of exceptionally high quality) was reduced from 3*s.* to 2*s.* 6*d.* per 1,000, and in addition the town got its public lighting for nothing. Of course the profits were reduced by these bounties, but they still exceed 20,000*l.* a year. The total cost of the old and new works has been over 500,000*l.*

The Bradford markets, of which the town is justly proud, have a history not less deserving of notice. Up to 1866 the lord of the manor, under several old charters, enjoyed exclusive rights of holding markets and fairs, taking toll or 'soke' on all malt and flour ground in the town. He exercised the market rights in a disagreeable way by using the streets for the exhibition and sale of cattle and horses, and the slaughter-houses were planted in the heart of the town. The 'soke' he let on lease. The corporation, after many efforts to remedy this condition of things, obtained an Act vesting the market rights in itself by lease for 1,000 years, at an annual rental of 5,000*l.* The 'soke' and the soke mill still remained, but the latter being originally worked by water-power, and the stream having become greatly polluted, the corporation insisted that the nuisance should be suppressed or that the 'soke' rights should be sold to the town. In the end the rights were sold, and with them a large area of land, afterwards disposed of to a railway company on terms which rendered the corporation purchase extremely easy. Having acquired the 'soke' rights, the use the corporation made of its power was to discontinue them at once and for ever. It removed the slaughter-houses to new and commodious premises at a suitable place; established in their vicinity a public market for the sale of live stock; and erected two handsome retail markets in the centre of the town. The total cost of these market operations was 157,000*l.* in addition to the annual rental of 5,000*l.* The income covers all charges, including sinking fund, and will in due course become a source of profit.

The greatest difficulty, however, with which the corporation had to contend, was the general sanitary condition of the town—destitute of sewers, ill-paved, with narrow streets, and everything unsuited to modern ideas. In 1850 was obtained the first of a series of Improvement Acts, and work was begun in earnest. The town is now well drained, a reform which has cost the ratepayers 310,000*l.*, besides the cost of private drains. The corporation has constructed sewage purification works, which serve their purpose admirably. In the scarcely less important matter of street improvements, Bradford has striven, while providing adequate thoroughfares for the growing traffic of the town, to secure for the inhabitants those physical conditions of health and vigour, both bodily and mental, without which manufacturing skill could be of no avail. Perhaps no town in the kingdom has undergone so complete a metamorphosis as Bradford in the arrangement of its streets and the erection of its buildings. Within the memory of men under forty the centre of the town has been almost entirely reconstructed. In this process the 'slums' have disappeared, not by the cumbrous machinery of the Artisans' and Labourers' Dwellings Acts, but by local Acts scheduling the property required, and empowering compulsory purchase. Fine broad streets have been driven through what were regions of dismal squalor, and the expulsion of dirt has been compelled by the introduction of sun and air. Co-ordinately with these changes sanitary laws have been rigorously enforced, until the death-rate, which was frequently as high as 30 per annum in the 1,000, is now below the modern average, and lower than that of many watering-places to which people resort for health and recreation. Notwithstanding the excess of infant mortality incident to a town where so many mothers work in the factories, Bradford often stands at the head of all the twenty-eight large towns in the country, its death-rate not unfrequently being only 15 in the 1,000. For last year the rate was 18·3.

But it may be asked have not such enormous changes in the town been very costly to the rate-payers? The answer is both 'yes' and 'no.' The expenditure has no doubt been very large, but so has the return. The local debt to-day is no less than four millions sterling, secured only on the rates, but the assets that can be shown for that debt are so considerable that investors are still willing to lend at 3½ to 3¾ per cent. The expenditure on street improvements has amounted to 1,123,000*l.*, but it has been a remunerative expenditure, because the frontages of the new streets are sold for more than the old property cost, and because also, fine business premises yielding large rates have taken the place of tumble-down property which brought in little income to the town.

In making provision for physical and intellectual recreation, the household voters of Bradford have shown an enlightened and self-denying interest. They have voluntarily taxed themselves to the amount of nearly 300,000*l.*, out of which sum have been provided four large parks and a recreation ground, all within easy reach of the centre of the town; a free library, circulating and reference; an art gallery and museum, and seven branch free libraries.

Such, then, are some of the principal achievements of household suffrage in Bradford. The voluntary

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liberality of its people has also provided and maintained a general hospital, a fever hospital, an eye and ear hospital, and many other public institutions. Although the exigencies of the town have demanded the execution of all the public works before referred to within the compass of a few years, the pecuniary burdens on the inhabitants are light, the whole rating of the borough, including all municipal charges, school board expenses, poor rate, sanitary, police, and improvement charges, being only 4*s.* 6*d.* in the pound. Bradford is not yet an ideal town; there is still much work to do. But its history in the last fifty years is surely of a creditable character, and one of which its inhabitants have a right to be proud.

BUILDING MATERIALS.

By JOHN SLATER, B.A.

Fellow of the Royal Institute of British Architects.

IV.—ROOF COVERINGS.

IN covering buildings for the purpose of preserving them from the weather, the climatic conditions of the locality must always be considered. The first thing to be determined is the pitch or inclination to the horizon to be given to the roof. In hot climates where rain is not frequent but falls in torrents when it occurs, a flat pitch is desirable in order to check the velocity of the rain-water which runs down the roof; but in cold countries where much snow falls during the winter, the pitch should be steep that the snow may easily slide off as it accumulates, and thus prevent damage to the framework of the roof from the superincumbent weight. An ingenious table has been drawn up, showing the increase of pitch that should be given to a roof for every degree of latitude north or south of the equator; but such a table can only be of general application. Several different kinds of materials are in use for forming the outside covering of roofs, and their suitability depends largely upon the pitch, some materials such as copper or lead being used with perfect safety at a very low inclination or even quite flat, while others such as thatch should never be used at a less slope than 45°. Some materials that were formerly used for roofing have now become quite obsolete; for instance, it is very rare indeed now to find roofs covered with shingles or shides, which were small wedge-shaped pieces of wood about an inch thick at one end, and measuring 9 inches by 5 inches, closely resembling weather boarding; these were extensively used in some country districts. Again, in Shropshire, Gloucestershire, and other places, thin flags called tile-stones were frequently used for roofs, but the facilities of transport are now so great that h have been entirely superseded by the more suitable Welsh slates, or artificial tiles, the manufacture of which has greatly increased and improved of late years. Good roofing materials can now be obtained so cheaply that there is little temptation to builders to supply inferior kinds, and the cause of bad and leaky roofs is to be sought for more in the carelessness or ignorance of the workman than in the badness of the materials.

By far the most important roofing material, and the one in most general use at the present time, is slate. Slate is an argillaceous sedimentary rock which, after being deposited as clay at a very early geological epoch, has been subjected to enormous mechanical pressure, the result of which has been that the beds have been squeezed together and the material rendered very dense and compact, while the original lines of stratification have been almost obliterated, and the particles have been rearranged in fresh planes perpendicular to the direction in which the pressure was exerted; along these planes the rock splits with great ease. The strength of the material has thus no connection with its natural bed, even when the latter can be discovered. This splitting or fissile property makes slate eminently useful as a building material, as, notwithstanding the fact that it is one of the hardest and densest of rocks, it can be obtained in such thin sheets that the weight of a superficial foot is very small indeed, and consequently, when used for covering roofs, a heavy supporting framework is not required. Slate absorbs a scarcely perceptible quantity of water, and it is very hard and close-grained and smooth on surface; it can be laid safely at as low a pitch as 22½ degrees. In consequence of this, the general introduction of slate as a roofing material has had a prejudicial effect upon the architectural character of buildings. The bold, high-pitched, lichen-covered roofs of the middle ages—which, with their warm tints, form so picturesque a feature of many an old-fashioned English country town—have given place to the flat, dull, slated roofs, which evidently are so oppressed by their own ugliness that they gladly retire from view behind a parapet, with the result that in most of our modern cities we are confronted with miles and miles of streets whose houses appear to consist of fronts alone, terminating skywards in one dull monotonous straight line.

The best roofing slate is obtained from North Wales, chiefly in the neighbourhood of Llanberis, where there are numerous quarries, those at Penrhyn being the largest; the slates from this district generally go by the name of Bangor. At Ffestiniog and in the neighbourhood there are also numerous quarries, the slates from which are generally designated Portmadoc slates, as they are shipped from this port. The colour varies from green to purple and black, and a good effect can be obtained in buildings by using alternate bands of different colours in the roof. Good slates are also obtained from Cornwall, where the quarries have been worked for a long period; and from the Lake district, those which come from the neighbourhood of Maryport being of a bright sea-green colour. As a general rule, the finer the grain of the slate and the cleaner and smoother the surface with which it splits, the better it will be. When the surface is coarse and uneven it is probable that the slates have been obtained from a bed where the pure rock was in close proximity to, and partly mixed with, some foreign substance such as sandstone; and such slates would be likely to absorb more water than the fine-grained varieties.

The large demand for roofing slates has led to the opening of many new quarries during the last few years, the slates from which are of varying degrees of excellence. Non-absorption of water is, of course, the most valuable characteristic; an easy test of this can be applied by carefully weighing one or two specimens when dry and then steeping them in water for a few hours and weighing them again, when the difference in weight will of course represent the quantity of water absorbed. The light-blue coloured slates are generally superior to the blue-black varieties.

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The chemical analysis of an average specimen of slate may be taken as

Silica	54·75	per cent.
Alumina	22·90	,,
Oxide of iron	9·66	,,
Magnesia	1·90	,,
Potash and soda	5·14	,,
Water	5·45	,,

Its specific gravity is 2·8.

Roofing slates are sorted into various sizes, which are sold under the following names :—

Queens,	the size of which is	36 in.	by 24 in.
Imperials	,, ,,	30 in.	by 24 in.
Princesses	,, ,,	24 in.	by 14 in.
Duchesses	,, ,,	24 in.	by 12 in.
Countesses	,, ,,	20 in.	by 10 in.
Viscountesses	,, ,,	18 in.	by 9 in.
Ladies	,, ,,	16 in.	by 8 in.
Doubles	,, ,,	13 in.	by 6 in.

Of these the Duchess and Countess slates are the most extensively used.

Slates should always be laid with a certain lap, that is, each course should overhang the next but one below it to a certain extent, and this should not be less than 2 inches. Thus there will be a certain width of slate in each course exposed, and this is called the gauge, its width diminishing as the lap increases. The gauge for any kind of slating is found by deducting the lap from the length of the slate, and then halving the remainder: thus, if Countess slates are laid with a 3-inch lap, the gauge will be $\frac{20-3}{2} = 8\frac{1}{2}$ inches. Each course of slates 'breaks joint' with the one below it. The average weight of ordinary slating may be taken as 7 cwt. per square of 100 superficial feet. The vallies of slated roofs are generally laid with lead turned up under the slates, and the hip rafters are either covered with lead—which is the best plan—or with thick saddle-back slates finished at top with an ornamental roll. Some years ago a system was introduced called patent slating. This consisted in laying large thick slates so that they butted against one another in a vertical line, the joints coming exactly over a rafter to which the slates were firmly screwed. The successive courses overlapped one another a few inches, and when the roof was covered, thin fillets of slate about 3 inches wide were bedded in putty over the vertical joints, tightly screwed down to the rafters, and pointed carefully all round. Slating could be laid in this manner to a very low pitch, and yet remain watertight for a considerable time, but it was found that a slight settlement of the roof was sufficient to injure it, and as the putty also soon perished, the system was abandoned, and it is now never adopted. It gave, however, a distinctly ornamental appearance to a roof.

The prevalence of the use of tiles for the best class of houses at the present time affords a curious example of the change that has occurred in architectural fashion in the last fifty years, for in Nicholson's 'Architectural Dictionary,' published in 1819, it is stated that 'in consequence of the weight and fiery appearance of tiles, slates have almost universally superseded them, and tiles are used only for cottages or small buildings.' The 'fiery colour' spoken of is undoubtedly bad, and if all tiles were of the brilliant hue that is occasionally met with in country districts, it is probable that their use as a roofing material would have remained restricted. But lately manufacturers have succeeded in producing a warm reddish-brown tint closely approximating to that of old weathered tiles, than which nothing can be more pleasing. Tiles are made from clay in much the same manner as bricks, but as they are thinner, they require a tougher clay, and considerably more care in their manufacture. The clay is dug and weathered, and then ground in a pug mill, so that it acquires great consistency. It is then formed into the required shape by being pressed into an oak mould, plated with iron. The clay is kept from sticking to the mould by dusting the latter with sand or fine coal dust. The tiles are then dried in the open air, and afterwards baked in a kiln, constructed on much the same principle as a brick kiln, but enclosed in a conical building called a dome. The period of burning depends upon the quality of the clay and the colour to which the tiles are to be burnt. This general description applies to nearly all roofing tiles, but of course the moulding processes vary according to the kind of tile that is being made. Till quite recently pantiles and plain tiles were the only kinds made, the former having a double curved surface, on the one side convex and the other concave, which shape is given to the plastic clay by hand. A small hollow in the mould gives the projecting nib by which pantiles are hung on the laths of a roof. The ordinary size of pantiles is 14½ by 10½ inches, and they are generally laid to a gauge of 10 or 11 inches. These tiles are only used for an inferior class of building, as it is difficult to keep a roof covered with them watertight for any length of time, as they can never be made to fit closely over each other at their lower edges, and consequently the rain has a tendency to drift up underneath them. They partially overlap laterally, but not sufficiently to make a watertight joint, and they are consequently frequently pointed with mortar, which forms a thick and ugly joint and soon perishes. The weight per square is about 10 cwt. The Bridgwater tiles are very similar to pantiles, but wider, and formed with a double roll.

Plain tiles are oblong in shape, with a very slightly curved surface, and they are either moulded with nibs for hanging on the laths, or are formed with two holes for nails or pegs. Their size is 10½ by 6¼ inches. Many very excellent specimens of plain tiles have been shown at the various building exhibitions which have been held lately, but it would be difficult to find any superior to the best Broseley tiles, which are well burnt, even in texture, and of a very pleasant tint. Plain tiles, of the size mentioned above, should be laid to a 4½ inch gauge, and they are either hung to the laths by their nibs or by pegs driven through the holes in their surface. Some builders are fond of bedding the heading joints in mortar, but it is very doubtful if this is a good plan. Of course it makes the roof somewhat tighter at first, but my own experience is that tile roofs almost always fail in consequence of the laths becoming decayed and allowing the tiles to slip, and the presence of the mortar accelerates this decay. It is, moreover, certain that if mortar be used the tiler will be disposed to depend upon it for keeping the tiles in position, and will not devote so much care to the proper hanging and pegging of each tile, and as all roofs are subject to slight movements due to changes of temperature and to varying wind pressures—have in fact a certain amount of 'spring'—this will instantly act upon the mortar

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joint, and will tend to disturb it: and in a very short time the mortar begins to fall away and helps to block up the roof gutters. In some country districts it is the practice to lay the tiles on a bed of hay laid over the laths, and this plan appears to answer very well if proper care be taken, and it adds to the warmth of a building in winter. It is not desirable to give tiled roofs a less pitch than 45°, and 50° is preferable.

With ordinary plain tiles, those in any one course do not overlap laterally; consequently each course must overlap to a certain extent the next but one below it, or the rain would enter between the joints. Of late years many attempts have been made to obviate this necessity, which is the cause of the great weight of this kind of roofing which is nearly a ton per 100 square feet. If tiles can be moulded so that they will fit into one another and form a watertight joint laterally, the successive courses need only overlap sufficiently to prevent the rain driving upwards, and this can be prevented by forming a groove at the upper edge of one tile into which a corresponding projection on the lower edge of the next tile would fit. This method has been adopted with considerable success in Phillips' patent lock-jaw roofing tiles which interlock with one another on all four sides, and form such closely-fitting joints that nothing can penetrate them; and the patentee claims that by exerting great pressure on the clay during the process of manufacture he is able to ensure uniformity and perfect fit without which the tiles would of course be practically useless. These tiles are of two different kinds: the 'Single

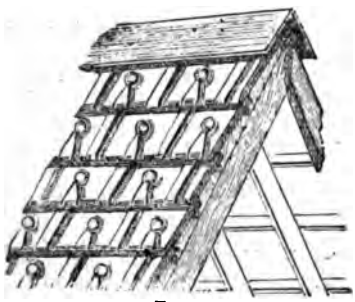

FIG. 1.

Grip,' shown in fig. 1, and the 'Double Grip,' fig. 2. The latter are suitable for the most exposed situa-

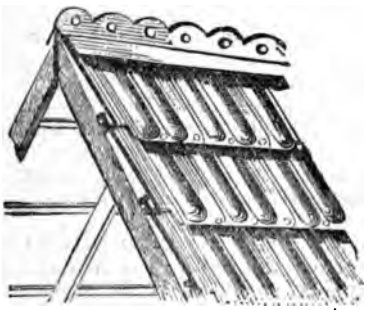

FIG. 2.

tions, and will stand the roughest usage. Half tiles are made for hanging next to a gable in alternate courses, in order to secure a perfect bond, in the same way that closers are used in brickwork. No mortar is required with them, nor any special skill in laying them. The difference between these tiles and the ordinary kind in the weight per square, 5½ cwt., and the number required, 150, is very striking, the weight being less than one-third that of ordinary tiles. Taylor's patent tiles are moulded with a different kind of lateral overlapping arrangement. All these patent tiles give a decidedly ornamental appearance to roofs, as they break up the plain surface into a series of elevations and depressions.

It is curious to notice how closely some of the new patent systems of tiling resemble those in use among the Romans and in the early part of the middle ages. Tiles were used at a very early period for roof coverings, and were first formed with rims on each side, and under the rims were notches forming a lap laterally; and hollow tiles, similar to common hip and ridge tiles, were laid over the vertical joints, themselves overlapping each other. An improvement was effected by making the tiles trapezoidal in shape, instead of rectangular, and thus the narrow end of one tile was pushed down till it closely fitted between the rims of the one below it; the notches under the rims were then discontinued, but the vertical joints were covered as before.

In the thirteenth and fourteenth centuries, in the old French province of Champagne, tiling was carried to very great perfection; and it is probable that no better tiles have ever been made than those which can be still seen in many buildings in Troyes and its neighbourhood. The tiles are very like the modern Broselys, but were made with one nib for hanging on the laths and one hole for nailing; and to show the extreme care which was taken with them, the position of the nib and the hole was reversed in each alternate course of tiles. This was done in order that, as the alternate courses were laid 'breaking joint,' the nail-hole should always come over the centre line of each rafter, and the nib always midway between the rafters. The rafters were of course fixed in the proper position for the tiles, which were laid to a gauge of about 4½ inches; and as the length was 12¾ inches, there was always a lap of nearly 4 inches. In some of the tiles of this period the exposed portion of each tile was glazed, and thus rendered non-porous. This would be an excellent plan to adopt with modern tiles, but it would render them too expensive for general use. There is, however, another peculiarity in the best of these old French tiles which might easily be adopted by modern manufacturers, and which would be a great improvement, and that is the chamfering of the lower edge of the tile as shown in the sketch.

The mould could easily be made of the shape requisite to form this chamfer, which would greatly diminish the risk of the tiles being ripped up by the action of a strong wind. The tiles of this period are frequently found in as good condition now as when first burnt.

The great objection to all tiles is their porosity which causes them to absorb a considerable quantity of water, and this tends to rot the woodwork underneath. This wooden substructure consists in the case of both slates and tiles, either of fillets of wood nailed on the rafters at intervals corresponding to the gauge required, or of close boarding similarly nailed to the rafters. For slates these fillets are generally 2½ inches or 3 inches wide and 1 inch thick, called slating battens, and the slates are nailed to them by nails—two to each slate—pass-

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ing through small holes pierced in the slate itself. For tiles, which are much heavier, stouter fillets are required, and the tiles are hung on to these by pegs passing through the holes in the tiles, or by the projecting nibs which have been already described. Close boarding is far preferable for either kind of covering, as it keeps the roof tighter and warmer, and in case it should be necessary for workmen to pass over the roof for any purpose after its completion there is much less danger of the slates or tiles being broken than with battens. The risk of damage from high winds is also much less, but this point will be referred to more in detail further on.

In country districts the roofs of cottages and outbuildings are frequently covered with thatch. This consists of layers of straw—wheaten straw is the best, lasting twice as long as oaten—about 15 inches in thickness, tied down to laths with withes of straw or with string. Thatch is an excellent non-conductor of heat, and consequently buildings thus roofed are both cooler in summer and warmer in winter than others, and no better roof-covering for a dairy can be found. Thatch is, however, highly combustible, and as it harbours vermin and is soon damaged it is not really an economical material though the first cost is of course small. A load of straw will do a square and a half of roofing, that is, 150 superficial feet.

Felt is often used for covering roofs of outbuildings. It should be nailed down to close boarding, the edges of the sheets overlapping, and if a double layer be applied, with a coating of tar on each, and the top layer be sprinkled over with sand it forms a good and cheap covering for a time. It requires, however, a fresh application of tar and sand every two or three years. In Germany a material closely resembling felt, called '*Dachpappe*,' is frequently employed for covering roofs of manufacturing premises. This is a species of pasteboard or carton-pierre, two layers of which are nailed to close boarding and tarred and sanded. Roofs covered with this material are laid to a very flat pitch not more than sufficient to throw the water off in one direction, and instead of fixing a gutter at the eaves, small fillets of wood are nailed to the boarding, sloping in two directions upwards and meeting at the bottom where an outlet for the water is formed. These fillets are completely covered with the *dach-pappe*. These roofs are extremely light, and if the material is carefully laid they remain watertight for a considerable period.

The structural arrangement of a building frequently renders it impossible to form a sloping roof over all parts of it, and hence flats are necessary. When this is the case metal coverings are the best that can be adopted. Formerly it was not uncommon in buildings where cost was not a consideration to use sheet copper for covering flats or slight slopes, and a large portion of the roof of the British Museum galleries is laid with this material. Copper forms a very light covering, as it may be safely used in sheets not more than ·03 inches thick, which would weigh about 20 ozs. per foot super. Copper slowly oxidises when exposed to the air, but the oxide does not eat into the substance of the metal as is the case with iron; it seems rather to form a protective coat. The cost of copper renders its use very limited, and zinc has to a large extent taken its place.

Zinc is also a very light covering, in fact its specific gravity is slightly less than that of copper, but it has not a good reputation, owing to the fact that on its first introduction it was used in very thin sheets and sufficient care was not taken in laying it. Its expansion is greater than that of any other metal, and therefore it should always be laid with ample play or it will soon buckle and crack. The Vieille Montagne Company have greatly improved the methods of laying zinc, and they have also introduced thicker sheets than could previously be obtained, and if zinc is used at all it should never be less than No. 16 gauge, which weighs about 24 oz. to the foot super, and is as nearly as possible $\frac{1}{24}$th of an inch thick. Zinc resembles copper in the fact that it oxidises on the surface only, but in smoky districts it will not last at all, as sulphuric acid completely destroys it.

The surface oxidation only of zinc when exposed to ordinary atmospheric influences, suggested the attempt to prevent the rusting of iron by giving it a thin coating of zinc. This led to the production of galvanised iron for roofing purposes. This galvanising process consists in first precipitating tin upon sheets of iron by means of weak galvanic action, and then placing the plates in a bath of liquid zinc. Iron thus treated will last, under favourable circumstances, for a long time, but when used for roofing it is almost impossible to avoid nailing the sheets in some places, and where the nail holes occur, moisture invariably makes its way to the iron itself, which rusts internally, and the thin zinc coating then comes off in flakes. What was previously stated as to the action of sulphuric acid upon zinc will show the utter uselessness of galvanised iron in smoky districts.

The most durable metal covering for roofs is milled lead. This is lead which, after being cast, is passed through a mill between rollers adjusted so as to give the requisite thickness to the sheets which are rolled out. This thickness varies from ·075 inches to ·236 inches, the weight of these qualities being 4 lbs. and 14 lbs. respectively per superficial foot. The qualities chiefly used for roofing are the 5, 6, and 7 lb. lead, the latter being the lightest that should be used for flats or gutters. In laying lead on flats they should be close boarded, and care must be taken to allow for the due expansion and contraction of the metal; consequently the joints of two adjacent sheets must not be soldered together. In order to prevent the water from penetrating at the joints, fillets of wood, $2\frac{1}{2}'' \times 2''$, rounded at the top, called rolls, are nailed to the boards, and one sheet of lead is dressed close up to and half way over the roll, while the next sheet is brought up to the opposite side of the roll, and lapped completely over the roll and the turned-up portion of the first sheet. If the lead is closely hammered down with wooden mallets no nails are required, and they are better omitted. When it is necessary to nail the lead round skylights or in other positions copper nails should always be used.

There is one very interesting question connected with roof coverings which can only be briefly alluded to here; and that is the actual effect upon them of wind pressure. A gale of wind never passes over a city without blowing down into the streets a number of tiles and slates, to the imminent danger of passers by. The cause of the slates being blown off is not quite so simple as might at first be imagined. Where loose ridge tiles or broken slates occur these are blown off as a matter of course, but it frequently happens that roofs which were per-

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fectly sound are seriously damaged. As the direction in which the force of the wind acts is horizontal, there would seem to be no tendency to rip up or break off materials lying so closely upon one another as slates. The true explanation is probably this: any exceptionally strong gust of wind is succeeded by a momentary vacuum, and as under ordinary circumstances the atmospheric pressure inside and outside a roof is equal, it follows that during the brief continuance of the vacuum outside the pressure inside is considerably in excess, and the weakest points of the roof covering will have a tendency to be pushed outwards. Now in roofs covered with battens, to which the top only of the slates are nailed, the lower portions of the slates would be much less able to resist any such outward pressure, and would be forced upwards, and if at such a moment another gust of wind were to occur it would find its way under the slate and break it. If the rafters were covered with close boarding instead of battens this would offer a far more even resistance, and for this reason close boarded roofs are much less liable to damage from wind. The whole question of the action of wind upon sloping roofs has not received the attention from professional men that its importance demands.

THE REGISTRAR-GENERAL'S LAST QUARTERLY RETURN.

By J. HAMPDEN SHOVELLER.

THE quarterly return of marriages, births, and deaths in England and Wales has recently been issued by the Registrar-General. The statistics relating to marriages are for the third quarter of 1883, and those relating to births and deaths are for the last three months of that year. The marriage-rate showed a slight increase upon that recorded in the corresponding period of the previous year; both the birth-rate and the death-rate showed a marked decline from those which prevailed in the last quarter of the preceding year. The mean temperature during the quarter at the Royal Observatory, Greenwich, was 44°·9, and exceeded by 1°·3 the average for the corresponding period of 112 years. The rainfall amounted to only 5·26 inches, which was nearly two inches below the average amount.

During the third quarter of 1883 the marriages of 104,384 persons were registered in England and Wales, equal to an annual rate of 15·5 per 1,000 of the population, estimated by the Registrar-General to be about twenty-six and three-quarter millions of persons in the middle of the year. This marriage-rate showed a slight further increase upon the rates recorded in the same periods of the four preceding years, and corresponded with the average marriage-rate in the third quarter of the ten years 1873–82.

The births of 214,882 children were registered in England and Wales during the last quarter of 1883, equal to an annual rate of 31·8 per 1,000 of the estimated population. This birth-rate was lower than that recorded in any of the ten preceding corresponding quarters. In the several counties the birth-rates ranged from 26·2 in Hertfordshire, 26·4 in Shropshire, and 26·9 in Dorsetshire, to 36·3 in Staffordshire, 37·2 in Durham, and 37·3 in Nottinghamshire. The 214,882 births registered in England and Wales during the last three months of 1883 exceeded the deaths by 85,977; this represents the *natural* increase of the population. From the Board of Trade returns it appears that 61,778 emigrants embarked during last quarter from the various ports of the United Kingdom at which emigration officers are stationed. Distributing those whose nationality was undistinguished, and excluding foreigners, the emigrants of British origin were 52,805, including 37,832 English, 5,138 Scotch, and 9,835 Irish. The proportions of British emigrants to a million of the respective populations of the three divisions of the United Kingdom were 1,413 from England, 1,343 from Scotland, and 1,950 from Ireland. Compared with the corresponding quarter of 1882, emigration last quarter showed an increase in England and Ireland, but a slight decline in Scotland.

From returns furnished by the Local Government Board it appears that the average number of paupers relieved on the last day of each week in the fourth quarter of 1883 was 696,785, of whom 178,715 received indoor, and 518,070 outdoor relief. The proportion of the population in receipt of pauper relief last quarter showed a further decline from that recorded in the corresponding periods of the two preceding years.

The deaths registered in England and Wales during the last three months of 1883 were 128,905, corresponding to an annual rate of 19·1 per 1,000 of the estimated population; this death-rate was 1·8 per 1,000 below the average rate in the corresponding period of the ten years 1873–82, and with the single exception of 1881 (when the rate was so low as 18·7 per 1,000) was a lower rate than has been recorded in England and Wales in any quarter since the civil registration of births and deaths was first established in 1837. This low rate of mortality last quarter implies that nearly 17,000 persons survived who would have died had the death-rate corresponded with the average rate in the corresponding quarter of the past forty-five years.

In the various counties the death-rates ranged from 13·1 in Rutlandshire, 14·7 in Dorsetshire, and 15·2 in the extra-metropolitan portion of Surrey, to 21·8 in Staffordshire, 21·9 in Monmouthshire, and 22·7 in Lancashire. In the urban districts, comprising the chief towns and containing an estimated population of 16,080,338 persons, the death-rate last quarter averaged 20·7 per 1,000; in the remaining or rural population of about 10,682,631 persons, the rate of mortality did not exceed 16·6. These urban and rural rates were respectively 2·2 and 1·4 per 1,000 below the average rates in the ten preceding corresponding quarters.

In twenty-eight of the largest English towns, including London, and having an estimated population of more than 8,500,000 persons, the death-rate during the last quarter of 1883 averaged 21·2 per 1,000, and exceeded by 0·5 the general urban rate. While the death-rate did not exceed 20·3 in London, it averaged 21·9 in the twenty-seven provincial towns, among which it ranged from 16·8 in Portsmouth and 17·7 in Bradford, to 25·7 in Preston, 26·7 in Newcastle-upon-Tyne, and 27·9 in Manchester. The value of urban, and indeed all, death-rates for comparative and other purposes would be greatly increased if the rates of mortality at various groups of ages were published from time to time. The age-distribution of the population of our large towns is found to differ considerably; and the value of death-rates at different groups of ages, for public health and statistical purposes, can hardly be over-estimated. It

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may be noted that the death-rate among infants in the twenty-eight towns last quarter, measured by the proportion of deaths under one year of age to 1,000 births, ranged from 114 in Portsmouth to 220 in Preston; that among persons aged between one and sixty years, the rate of mortality did not exceed 8·0 in Norwich, whereas it was equal to 17·9 in Manchester; and that the death-rate among persons aged upwards of sixty years ranged from 55·2 in Leicester to 102·4 in Halifax.

The 128,905 deaths in England and Wales last quarter included 30,560 of infants under one year of age, 64,932 of children and adults aged between one and sixty years, and 33,413 of persons aged sixty years and upwards. Infant mortality was equal to 142 per 1,000 births, and was slightly below the average of the ten preceding corresponding quarters. In the twenty-eight great towns the proportion of infant mortality averaged 159 per 1,000; it did not exceed 144 in London, but averaged 170 in the twenty-seven provincial towns, among which it ranged from 114 and 123 in Portsmouth and Sunderland, to 195 in Manchester, 200 in Blackburn, and 220 in Preston. Among persons aged sixty years and upwards the rate of mortality in England and Wales was considerably below the average.

The deaths registered in England and Wales during the last three months of 1883 included 15,287 which were referred to the principal zymotic diseases; of these, 4,197 resulted from scarlet fever, 3,148 from diarrhœa, 2,493 from measles, 2,197 from fever (including typhus, enteric or typhoid fever, and simple continued fever), 1,794 from whooping-cough, 1,227 from diphtheria, and 221 from small-pox. These 15,287 deaths were equal to an annual rate of 2·27 per 1,000, against an average rate of 2·87 for the ten preceding corresponding quarters. In the twenty-eight towns this zymotic rate averaged 2·76 per 1,000 last quarter, and ranged from 0·72 and 0·74 in Norwich and Halifax, to 4·76 in Preston, and 5·25 in Leeds. In fifty other large towns this zymotic death-rate averaged 2·84 per 1,000 last quarter, while in the remainder, or rural portion, of the country it did not exceed 1·89 per 1,000.

Scarlet fever was the most fatal zymotic disease in England and Wales during the last three months of 1883. The 4,197 fatal cases of this disease were equal to an annual rate of 0·62 per 1,000, which was considerably below the average in the corresponding quarters of the ten preceding years 1873-82. In the twenty-eight great towns the highest scarlet fever rates were 1·33 in Sheffield, 1·83 in Newcastle-upon-Tyne, and 3·48 in Leeds. Among the fifty other towns the rate was equal to 5·26 in Wigan, 5·70 in Ashton-under-Lyne, and 6·27 in Dudley. The 3,148 deaths attributed to diarrhœa were equal to a rate of 0·47 per 1,000, and were slightly below the average; the average rate in the twenty-eight towns from this disease almost corresponded with the general English rate, but the diarrhœa death-rates were excessive in Bolton, Blackburn, and Preston. The fatal cases of measles were 2,493, and the annual rate equal to 0·47 per 1,000, or slightly below the average in the last quarter of the ten preceding years. In the twenty-eight towns the measles rate averaged 0·51, but was equal to 1·41 in Manchester, and 1·75 in Salford. Among the fifty other towns the highest death-rates from this disease were 3·89 in Cambridge,

Analysis of the Vital and Mortal Statistics of the Twenty-eight Great Towns, dealt with in the Registrar-General's Weekly Returns, for the Fourth Quarter of 1883.

Towns.	Estimated Population middle of 1883.	Births.	Deaths.	Annual Rate per 1,000 Living.			Deaths from Principal Zymotic Diseases.	Small-pox.	Measles.	Scarlet Fever.	Diphtheria.	Whooping-cough.	Fever.	Diarrhœa.	Rate per cent. of Uncertified Deaths.	Deaths of Children under one year of age to 1,000 Births.
				Births.	Deaths.	Principal Zymotic Diseases.										
28 Towns	8,620,975	71,280	45,525	33·2	21·2	2·8	5,930	121	1,092	1,647	422	765	858	1,025	2·5	159
27 Towns	4,665,161	39,325	25,513	33·8	21·9	2·9	3,371	89	605	946	134	385	466	746	3·5	170
London	3,955,814	31,955	20,012	32·4	20·3	2·6	2,559	32	487	701	288	380	372	279	1·3	144
Brighton	111,262	747	551	26·9	19·9	2·8	78	—	24	4	2	33	9	6	3·1	147
Portsmouth	131,478	1,198	550	36·6	16·8	1·2	4c	—	5	3	1	2	23	6	1·3	114
Norwich	89,612	757	495	33·9	18·1	0·7	16	—	1	2	2	1	3	7	3·0	156
Plymouth	74,977	562	353	30·1	18·9	1·7	31	—	10	—	8	3	7	3	0·0	153
Bristol	212,779	1,675	930	31·6	18·7	1·1	58	—	5	10	5	6	9	23	2·0	160
Wolverhampton	77,557	649	377	33·4	19·5	1·5	28	3	—	6	—	—	3	16	8·0	147
Birmingham	414,846	3,462	2,077	33·5	20·1	2·8	285	40	68	54	11	17	21	74	1·2	149
Leicester	129,483	1,120	599	34·7	18·6	1·9	62	—	—	33	4	6	7	12	1·7	185
Nottingham	199,349	1,870	1,046	37·6	21·1	1·9	96	—	10	20	12	16	19	19	2·4	164
Derby	85,574	693	401	32·5	18·8	2·1	44	—	22	4	—	3	5	10	2·2	172
Birkenhead	88,730	761	467	34·4	21·1	2·4	52	—	27	7	1	5	—	12	3·6	164
Liverpool	556,753	4,664	3,450	33·6	24·4	3·8	537	12	122	106	15	78	109	95	6·0	187
Bolton	127,862	886	594	33·0	22·1	2·0	53	—	—	—	1	6	7	39	1·9	175
Manchester	339,252	2,933	2,358	34·7	27·9	4·3	360	—	119	101	8	38	19	75	2·5	195
Salford	190,465	1,613	1,176	34·0	24·8	4·1	205	—	83	41	8	22	21	30	4·3	188
Oldham	119,071	1,039	622	35·0	21·0	1·4	41	—	2	3	2	5	8	21	5·1	165
Blackburn	103,460	1,012	648	37·4	24·0	3·0	82	—	2	17	—	—	23	40	2·5	200
Preston	93,564	863	632	35·4	25·7	4·8	17	—	—	31	1	1	29	55	[illegible]	220
Huddersfield	84,701	680	443	32·2	21·0	2·9	62	—	20	1	—	33	3	5	[illegible]	182
Halifax	75,521	491	376	26·1	20·0	0·7	14	—	—	—	1	—	9	4	[illegible]	185
Bradford	204,807	1,374	901	26·9	17·7	1·5	78	—	16	13	4	5	19	21		163
Leeds	321,611	2,608	1,992	31·5	24·9	5·3	421	—	5	279	18	23	48	48	[illegible]	191
Sheffield	295,497	2,667	1,505	36·2	20·5	2·8	207	—	18	98	—	42	16	33	[illegible]	143
Hull	176,296	1,543	882	35·1	20·1	1·8	77	—	—	9	11	9	10	38	[illegible]	163
Sunderland	121,117	1,223	623	40·5	20·6	2·8	84	32	2	9	7	3	9	22	[illegible]	123
Newcastle-on-Tyne	149,464	1,378	934	37·0	26·7	4·8	177	2	41	65	5	23	16	28	[illegible]	164
Cardiff	90,053	854	530	38·1	22·3	2·9	66	—	3	27	7	5	14	10	[illegible]	178

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and 4·01 in South Shields. The rate of mortality from fever was equal to 0·33 per 1,000, and, with one exception, was lower than that recorded in the December quarter of any of the ten preceding years, in which it averaged 0·48 per 1,000. The fever death-rate in the twenty-eight towns averaged 0·40, and was highest in Liverpool, Blackburn, and Preston; among the fifty other towns the highest fever-rates were recorded in Swansea, Ystradyfodwg, and Wigan. The deaths referred to whooping-cough in England and Wales last quarter were considerably fewer than those registered in any corresponding quarter since 1876, and were equal to a rate of 0·27 per 1,000; the highest death-rates from this disease in the twenty-eight towns were recorded in Brighton and Huddersfield. The 1,227 fatal cases of diphtheria exceeded those returned in any quarter during the past fourteen years; among the large towns this disease showed the largest proportional fatality in London, Cardiff, and Plymouth. Of the 231 deaths from small-pox recorded in England and Wales last quarter, 121 occurred in the twenty-eight great towns, of which 40 were returned in Birmingham, 32 in London, 32 in Sunderland, 12 in Liverpool, 3 in Wolverhampton, and 2 in Newcastle-upon-Tyne.

The causes of 116,974, or 90·7 per cent. of the total, deaths in England and Wales last quarter were certified by registered medical practitioners, and 7,057, or 5·5 per cent., by coroners in inquest cases. The causes of the remaining 4,874, or 3·8 per cent., were not certified; this proportion showed a slight increase upon the declining percentages in recent quarters. The proportion of uncertified deaths in London was only 1·3 per cent., whereas in the rest of England and Wales it averaged 4·2 per cent. In the twenty-eight towns the proportion of uncertified deaths averaged 2·5 per cent., and showed the largest excess in Hull, Liverpool, Wolverhampton, and Halifax.

THE Manchester Corporation have decided to levy a domestic water rate of 9*d.*, and a public water rate of 3*d.* in the pound, to raise the money requisite to meet the expenses connected with the supply of water for the current year.

CONSIDERABLE excitement has been caused in Newcastle by a report of the contamination of the water supply at its source, which was very properly furnished to the Council by Dr. Huntley, of Humshaugh. In consequence of this communication a committee of inspection was sent to view the condition of the Water Company's reservoirs and their feeders, and found just cause for complaint. At the Little Swinburne reservoir they found that the liquid manure and other refuse of a large farm, with at least 100 head of cattle, ran direct into the reservoir. There is a large pond on this farm, the water of which is continually washing several manure heaps in close proximity to it. This foul water—in which also the manure carts are constantly washed—finds its way unchecked along with the sewage of several labourers' cottages, to the reservoir, from whence the good people of Newcastle imagine they obtain nothing but pure water. Several other instances were noted in the neighbourhood, where the water was being contaminated by farm sewage. At a special meeting of the City Council it was agreed that the city engineer and medical officer of health should visit the locality complained of, and examine into and report fully as to the position, collection, storage, conveyance, and distribution of the water supply to the city, with a view to secure an ample supply of pure and wholesome water for domestic use. A vote of thanks was accorded by the Council to Dr. Huntley for his valuable services.

THE

SANITARY RECORD.

MARCH 15, 1884.

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The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

POLLUTION OF WELLS.

AT a time when the water question is prominent in every one's mind, the decision of Mr. Justice Pearson in the recent case of Ballard *v.* Tomlinson has caused both astonishment and alarm. The plaintiff in that case was a brewer, and owned a valuable well sunk 300 feet deep in the chalk, and his complaint was that the defendant, who owned a similar well 90 yards off, had constructed a drain into that well, and consequently that sewage water percolated through the intervening soil and spoiled the water in his (the plaintiff's) well. Mr. Justice Pearson decided that the plaintiff had no right of action, as it was settled law that if the defendant had drained the water away from the well instead of putting sewage into it, he would have had no right of action. This decision is directly at variance with the decision in a case of Womersley *v.* Church, which was decided by Lord Romilly in 1867, and was not appealed from. There the plaintiff complained that his well was contaminated by leakage from the defendant's cesspool, and on the fact of the contamination being established, Lord Romilly granted an injunction to prevent its continuance. There is also a decision of the Court of Exchequer Chamber (which corresponds in authority to the Court of Appeal at present), given in the year 1860, in which it was decided that a gas company were liable for the consequences of gas workings getting by underground percolation into a well; that case, however, was decided on the words of a private Act of Parliament, and is not so directly in point as the case of Womersley *v.* Church, above referred to. Judging from the report in the *Times*, Mr. Justice Pearson, when he decided the case of Ballard *v.* Tomlinson, was unaware that there were any such previous decisions bearing upon the point before him. It is to be hoped that the case will be taken to the Court of Appeal, so that the law, which has now been rendered doubtful, may be settled. There is no doubt as to the helplessness of a man who finds the water abstracted from his well by reason of a deeper well being sunk close by. For an injury such as that he has no remedy, and he must put up with the loss of his water supply without being able to recover any compensation for it. The case, however, is different as regards pollution. No one has a right to store offensive matter on his premises, or let it escape from them so as to poison his neighbours. Just as in the case of water stored up in a reservoir, it is settled law that the man who impounds the water and so collects it in quantities which may under certain circumstances be mischievous, is liable for the consequences if it causes damage; so it would seem right to hold a man liable for damage caused by sewage escaping from his

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cesspool or by noxious matters accumulated by him in his trade, whether the damage is caused by percolation or by direct contamination. There is a difference in the facility of proof in the two cases, but no difference in the nature of the wrong done. The reasoning by which Mr. Justice Pearson's decision was arrived at seems to have been based on a fallacy, and Lord Romilly's earlier decision to have been right. In consequence of the two decisions being contradictory, it may be necessary for some owner of a well to be public spirited enough to take the question to the Court of Appeal or to the House of Lords; but eventually the right to have a water supply protected from pollution, whether it comes underground or in a manner more easily traced, will be clearly established.

DWELLINGS IN CROWDED DISTRICTS.

THIS subject continues to attract, and justly so, very considerable attention both in and out of Parliament, and has led to the appointment of a Royal Commission, which, it is to be hoped, will speedily make a report, as, what with waiting for that, and perhaps the passing of the London Municipality Bill, nothing more than talk can now be expected. Much of the present evil is attributable to the fact that in some parishes it is stated that the leading members of the vestries are owners of a large amount of this kind of property, and Sir Charles Dilke said, during a late debate on this subject in the House of Commons, that probably the Royal Commission would inquire into these statements. It does not appear, however, that the houses in Clerkenwell, which were especially mentioned, are the worst in London. On the contrary, it is admitted that places occupied by foreigners and let out by foreign landlords are the worst. The vestries have been blamed, and in many instances justly, for not having sufficiently put into operation the provisions of the Nuisances Removal Acts, and that they have not carried out Torrens' Acts at all. But what steps is it likely the vestries of poor parishes will take when the action to be adopted means a large expenditure of money out of the rates, for the erection of buildings which are not likely to be occupied by the class turned out for the improvements? Hitherto the erection of the Peabody and Waterlow buildings has not in any way met the case, as the rent is too high, and the accommodation not suitable for the very poor. Yet, something must be done as regards the provision of new and of more dwellings for the very poor, as it is admitted by the clergy, district visitors, and others, who visit the poor, that overcrowding has increased in the central parts of London, such as Holborn, St. Luke's, and part of St. Pancras. Unfortunately the census returns do not enable these statements to be satisfactorily discussed, as the enumerated districts are too large; but they afford corroboration of these statements. Thus, we find that in Holborn district in 1871 there were 16,435 houses with 163,491 inhabitants, or less than 10 persons to a house, whilst in 1881 there were 15,143 houses and 151,835 population, or rather more than 10 persons to a house. In St. Giles, in 1871, there were 4,566 inhabited houses with a population of 53.556, and in 1881 only 3,962 houses containing 45,382 inhabitants, or 11·7 persons per inhabited dwelling-house in 1871, and 11·5 in 1881, so that the pulling down of so many houses, more than one-eighth of the whole number, had reduced the population per house by 0·2, or one person in each five houses. In Holborn the destruction of 1,312 dwellings out of 16,455, or one in each twelve and a half, has led to an increased number of inhabitants occupying the dwellings, and consequently to greater overcrowding. These two instances alone show the insufficiency of the action hitherto taken to abate overcrowding, which is admitted on all hands to be one of the most important factors of the present insanitary condition of the dwellings of the poor, as well as most injurious to morality.

When this subject was recently under discussion in the House of Commons, Mr. Balfour referred to the large percentage of demoralised population now found in these houses, and pointed out that they must always be met with in London, as it is the natural refuge for the residuum, the criminal classes, and others desirous of concealment. For these he had no remedy. The same may also be said of the lower class of labourers, who do not care how they are housed provided that they are protected from the weather. The great success attending Miss Octavia Hill's movement has depended upon the intercourse between these persons and others who have taught them the beauty of cleanliness and the necessity for the separation of the sexes at night. Much good will doubtless arise from the education of children in the Board schools, but much of this will be lost if the present injurious dwellings are not improved.

The remedies hitherto proposed are utterly insufficient to meet the necessities of the case, and the same may be said of Mr. Balfour's proposal to lend money to builders at a low rate of interest. Doubtless some good may be done by stimulating the Metropolitan Board of Works to carry out more effectually and speedily the provisions of the Artisans' Dwellings Acts, especially as regards the erection of dwellings on the vacant sites. The vestries and Boards can also materially assist by carrying out more firmly and extensively the powers conferred upon them by the Nuisances Removal and Sanitary Acts, and especially by making and enforcing regulations for houses let in lodgings. The fear, however, is that these regulations will be bound up with too much red tape to allow of their ready and easy enforcement. If properly used, they are a powerful weapon in the hands of vestries and their officers against owners of unhealthy dwellings, especially as after the service of a copy of the regulations on the owner or other responsible person, a summons for penalties can be at once taken out for every case of neglect. Magistrates also are not asked to decide whether or not the matters complained of are injurious to health, but only if the regulations have been complied with or infringed. This is an important point, as in many instances it is difficult to say when a nuisance becomes, or ceases to be, injurious to health. Although only a few of the metropolitan vestries and Boards have made regulations, yet much good work has been done in most parishes and districts, as was shown in a very marked manner by the returns sent by them to the Metropolitan Board of Works some time since.

Amongst other matters specially referred to by Sir C. Dilke in his reply to Mr. Balfour was the large powers possessed not only by the Metropolitan Board of Works, but especially by the suburban sanitary authorities, to prevent the erection of injurious dwellings. There is not any doubt that if

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such houses are erected it is the fault of the surveyors or of the local authorities. The fact is that there is plenty of power to prevent most of the present scandals, but there is not a sufficient number of inspectors to visit the objectionable dwellings and see that the overcrowding is removed, and the works necessary to abate the nuisances are carried out. The inspectors also are, as a rule, too much left to their own consciousness of what is right and what is wrong. There is too much 'may' and too little 'shall' in the arrangements for enforcing the provisions of the various Metropolitan Sanitary Acts.

NOTES OF THE MONTH.

THE METROPOLITAN BOARD OF WORKS AND ARTISANS' DWELLINGS.

THIS Board has again attempted to evade the duties cast upon it to provide dwellings for the poor who will be evicted by the Board's proposed improvements. Sir J. M'Garel Hogg, in moving that their Various Powers Bill should be read a second time, stated that, in consequence of the South-Eastern Railway Company having taken part of the land on which the Board intended to build, it is impossible to provide for as many persons as they are required to do. It was, however, pointed out that the Board has power to provide sites for dwellings of the poor within a certain distance of the one from which the old buildings were removed, and an instruction from the House of Commons was carried and ordered to be communicated to the committee to which the Bill will go, that no diminution in the number of the dwellings for the poor should be permitted. This, Sir J. Hogg said, was like attempting to put a quart into a pint pot. The Board should not, however, attempt to perform this feat, but must provide two pint pots for the quart by obtaining the necessary ground elsewhere. If years ago the railway and other companies, the City authorities, and the Metropolitan Board of Works had been compelled to provide dwellings for the persons they evicted, much less overcrowding and fewer dilapidated houses would now have been in existence, so that the law must in future be strictly complied with. Two improvements which it is said must wait are those of new streets, one of which would interfere with the Seven Dials, unless the clauses of the Improvement Acts are relaxed as regards the accommodation to be provided for the working classes, so that the importance of the resolution of the House is manifest. It is to be hoped that the Board will be taught that, whatever the cost may be, there must not be any relaxation, even with the consent of the Home Secretary, of those clauses of the Artisans' Dwellings Acts which require provision to be made for as many of the labouring classes as may be evicted by the destruction of the old dwellings.

ISOLATION HOSPITALS.

THE people of Gateshead have shown themselves to be somewhat in advance in regard to sanitary matters. On the 26th ult. a crowded public meeting was held in the Sheriff Hill School Room, to consider the recent outbreak of small-pox in the district and to take steps to prevent the further spread of the disease, which they were of opinion arose in no small degree from the unguarded state of the hospital for infectious diseases in that neighbourhood, there being little or no restriction on the admission of visitors and egress of patients. After an interesting discussion, in which the dangers arising from insufficient isolation of patients was fully dwelt on, it was unanimously resolved to draw the attention of the urban sanitary authority to the necessity of building a lodge near the entrance gates of the hospital, as the only effectual mode of removing the evil complained of. A sanitary committee was also formed to watch over all matters affecting the health of the district. In consequence of the outbreak of small-pox in the Lanchester district, the chairman of the Board of Guardians has requested Dr. Benson, their medical officer, to apply to the sanitary authority to hire some empty houses, to be used as a temporary hospital for infectious cases in order to secure better isolation, and afford greater facilities for promptly stamping out the disease. At the meeting of the Association of Municipal and Sanitary Engineers, held at South Shields on Feb. 16, Dr. Munroe, medical officer of health for that borough, read a very interesting paper on the construction of hospitals for infectious diseases, in which, *inter alia*, he pointed out that the amount of isolation accommodation required in a town did not depend so much on its size as on the character and occupation of the inhabitants. Dr. Munroe made several excellent suggestions in his paper, and after a discussion on the subject he was awarded a hearty vote of thanks. Another unsuccessful effort was made at the last meeting of the Newcastle City Council to change the site of the proposed hospital for infectious diseases which is to be erected at Heaton. The building of this highly desirable institution has been much delayed by the apathy and opposition of persons both inside and out of the council chamber. Scarlet fever is rife amongst several of the colliery villages in the county of Durham. The chief difficulty the medical officers have to contend with is the want of facilities for the isolation of patients, which, in a great degree, neutralises their efforts to stamp out the disease.

WHAT IS A PAUPER?

AN interesting discussion took place at a recent meeting of the Poplar Guardians, when a deputation from the Local Board of Works attended in the hope of arriving at some understanding as regards the removal of cases of infectious disease; and the question arose, what constitutes a pauper? It was stated that the relieving officer had referred the case of a man suffering from an infectious disease to the sanitary authority, because he was in receipt of 20*s.* per week. The Local Board could not secure the patient's admission to hospital by payment, and they were unwilling, on the score of expense, to open their own institution at Plaistow. The chairman replied that he could not decide the difficult problem as to what constituted a pauper. But in the present case was there any difficulty? Obviously a man in receipt of 20*s.* weekly cannot be in a state of pauperism, and it has been settled over and over again that the duty of providing for such cases is one belonging to the local sanitary authority. It was remarked incidentally that owing to the increase of fever and small-pox the Asylums Board had but few vacant beds, and the deputation was advised to open their own hospital, which they built some years ago

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at great expense, and which we believe has never been used.

THE BIRMINGHAM MILK SUPPLY.

FOLLOWING upon serious outbreaks of small-pox and scarlet fever in the centre of the Black Country district, and while yet the latter disease remains very bad and produces a number of deaths, has come an outbreak of typhoid in one particular part of the district, near Birmingham. It is of an endemic nature, and not of very severe type, although some deaths have resulted. The fact that most of the persons (nearly twenty) attacked were supplied with milk by one dealer led to investigations which resulted in the discovery that the water he used came from a polluted well. This well has been ordered to be closed. The man gets his milk supply from various farms in the district, but no source of infection has been traced in any of them, so that the outbreak is put down to the use of water from this well. The extensive adulteration of milk in Birmingham has been attracting considerable attention. Of seventy-six samples of milk taken during one year, 50 per cent. were adulterated; and, under these circumstances, it is thought that more energy should be exercised by the authorities in carrying out the provisions of the Adulteration Acts. The number of milk-sellers in Birmingham is over 1,900, and it is calculated that at the rate at which samples have been taken for testing of late it would take twenty-three years to get a sample from each.

THE BAKEHOUSE ACT OF 1883.

LOOKING to the very considerable misconception which seems to exist as to the scope of the Factory and Workshops Act of 1883 as regards retail bakehouses, it may be well to state that in addition to re-transferring to sanitary authorities throughout the kingdom the regulation of such bakehouses, the Act contains certain additional provisions as to the supervision of these places, the enforcement of which also devolves upon the local authority. For the purposes of the Act a retail bakehouse is defined as meaning 'any bakehouse or place, the bread, biscuits, or confectionery baked in which are not sold wholesale, but by retail in some shop or place occupied together with such bakehouse.' Proceedings may be taken before a Court of Summary Jurisdiction against the occupier, if the bakehouse is in such a state as to be on sanitary grounds unfit for use or occupation as such; and the Court may, in lieu of imposing a fine, or in addition thereto, order means to be adopted for the purpose of removing the ground of complaint. As regards bakehouses occupied or let after June 1 last, especial and stringent regulations are prescribed. The Act sets out that no water-closet, earth-closet, privy or ashpit, shall be within or communicate directly with the bakehouse; that any cistern for supplying water to the bakehouse shall be separate and distinct from any cistern for water to a water-closet; and that no drain or pipe for carrying off fæcal matter shall have an opening within the bakehouse. But the most important portion of the Act is that which delegates to a medical officer of health all such powers of entry, inspection, taking legal proceedings and otherwise as a factory inspector possesses under the Factory and Workshop Act, 1878. It will be the duty of the health officer, if in the course of his inspection or in any other way he becomes aware of the employment in a retail bakehouse of any person under the age of eighteen years, or any woman above that age, to give written notice thereof forthwith to the factory inspector of the district. Many of the provisions of this Act, and notably the one last referred to, are in exact accordance with the views expressed by many health officers, who were the first to deplore the bungling legislation which deprived their authorities of a duty that was one essentially within their province.

In the House of Commons, replying to Mr. Broadhurst, Mr. Russell said recently that with reference to the question as to legislation to prevent the construction of underground bakehouses, a clause on this subject was introduced into the Factory and Workshop Bill of last session, but was withdrawn in deference to opposition. The Act as passed, as above shown, contains a provision that any occupier of a place used as a bakehouse, which is in such a state as to be unfit for such use, is liable to penalties, and this applies to bakehouses under, as well as above ground. If experience would show that further legislation was required, Mr. Russell stated that the Government would be prepared to propose it.

TINNED PROVISIONS.

SOME time since Mr. Wynter Blyth, the health officer of St. Marylebone, devoted special attention to an examination of the preserved fruits sold in his district with a view of ascertaining the effect of the acid juice upon the tin receptacles. Altogether twenty-three samples were analysed, consisting of apricots, tomatoes, pine-apples, and cranberries, with varying results. The largest amount of dissolved tin, 11·05 grains per pound, was found in two samples of apricots, and the smallest, 1·58 grains, in one of tomatoes. Mr. Blyth observes that it is not clear what would be the influence of even the largest quantity of tin found if taken in the ordinary way. So little is known of the action of the salts of tin, that all that can be affirmed is that food should be free from foreign metals, and that if the tin compounds have any action whatever, it is likely to be one of an injurious nature. Having regard, however, to the not infrequent cases of poisoning by fish preserved in tin, the question deserves consideration whether the use of this article should not be superseded. Speaking recently at an inquest held on the body of a girl who had died from eating potted salmon, the coroner remarked that the condition of the tins had considerably deteriorated, and, that in the case of preserved lobster, it had been proved by experiment that the nitrate of tin found mixed with the fish had killed guinea-pigs. It would be much better, he added, if food of this description was put into glass vessels, a plan which would, no doubt, completely meet the difficulty if the hermetical sealing of such vessels could be readily accomplished.

SANITARY AID COMMITTEES.

THE following statement, reproduced from the *Charity Organisation Reporter* of Feb. 14, is an exemplification of the practical value of Sanitary Aid Committees. 'On Tuesday night the hon. secretary of a Sanitary Aid Committee had a letter from a doctor, saying that 1 A. Street wanted inspecting. On Wednesday morning she went to the house—a double one. Both landladies and several

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lodgers, when her errand was explained, expressed the greatest thankfulness that at last some one had come to see what they suffered, "and a lady, too—you can't rightly explain everything to a gentleman!" "Haven't you spoken to your landlord?" "Times out of mind, but he's a brute, he is—and he's got lots of money, too." This house held over thirty people. In the front area was one opening to the sewer, untrapped, and with an awful smell filling the neighbourhood even on this windy day. In the back were two openings, one choked up wholly, so that the yard and wash-house were swamped, another with a broken trap, up which also came a vile smell. The w.c. (the only one) had no water supply, and above it was stored the drinking water, which tasted horrid. That afternoon the hon. secretary communicated with the medical officer of health, who must have lost no time in having the house inspected and reported to his Committee, as on the following Friday the hon. secretary was informed that the owner had been "served with a notice to remedy defects mentioned."'

THE PUBLIC HEALTH
During February 1884.

THE mean temperature during the month of February at the Royal Observatory, Greenwich, was as high as 43°·4; it exceeded by 4°·9 the average February temperature in one hundred years, and was above that recorded in the corresponding month of any year since 1877, when it was 43°·5. An excess of temperature prevailed on eighteen days of the month, while on the other eleven days it was below the average. The warmest day of the month was the 13th, when the mean was 50°·6, and as much as 11°·6 above the average; the coldest day was the 28th, when the mean was only 34°·8, and 5°·4 below the average. Rain was measured at Greenwich on thirteen days during the month, to the aggregate amount of 1·5 inches, which corresponded with the average February rainfall in sixty-one years. During the first two months of this year the rainfall amounted to 3·3 inches, which was very slightly below the average rainfall in the same period of sixty-one years. The sun was above the horizon during 277·9 hours during February, and 46·3 hours of bright sunshine were recorded at Greenwich. This amount exceeded the average in the corresponding periods of the five preceding years 1879–83. South-westerly winds prevailed generally throughout the month, except during the third week, when the wind was south-easterly. The amount of ozone recorded during the month considerably exceeded the average.

In the twenty-eight large English towns, dealt with by the Registrar-General in his Weekly Return, which have an estimated population of nearly eight and three-quarter millions of persons, 23,722 births and 13,783 deaths were registered during the four weeks ending the 1st inst. The birth-rate, which in the two preceding months had been 31·7 and 34·9 per 1,000, further rose to 35·3 during February, but was 2·3 per 1,000 below that recorded in the corresponding period of last year. The lowest birth-rates last month in these twenty-eight towns were 27·5 in Brighton, 28·0 in Bradford, and 28·1 in Halifax; the rates ranged upwards in the other towns to 40·8 in Nottingham, 44·9 in Cardiff, and 47·4 in Sunderland. In London the birth-rate last month was 34·6, while in the twenty-seven provincial towns it averaged 35·9 per 1,000.

The annual death-rate in the twenty-eight towns, which had been 22·6, 21·7, and 21·0 in the three preceding months, further declined to 20·5 during the four weeks of February, and was considerably below that recorded in these towns in the corresponding period of the two preceding years 1882–83, when it was 26·6 and 22·8 per 1,000 respectively. During the first two months of this year the death rate in these twenty-eight towns has been so low as 20·8 per 1,000, which is an unprecedentedly low rate, the nearest approach to it being in 1883, when it was 22·8 per 1,000. The lowest rate of mortality in these towns last month was 16·3 per 1,000 in Portsmouth. The rates in the other towns, ranged in order from the lowest, were as follow:—Brighton, 17·2; Derby, 17·6; Wolverhampton, 17·8; Hull, 18·2; Bradford, 18·5; Leicester, 18·6; Bristol, 19·1; Norwich, 19·2; Birmingham, 19·4; Huddersfield, 19·6; London, 19·7; Blackburn, 19·9; Cardiff, 20·4; Birkenhead, 20·4; Halifax, 20·6; Plymouth, 20·6; Sheffield, 21·4; Salford, 21·4; Leeds, 21·5; Sunderland, 22·2; Nottingham, 22·5; Oldham, 23·4; Bolton, 23·5; Preston, 23·7; Liverpool, 23·9; Newcastle-upon-Tyne, 24·0; and the highest rate during the month 27·8 in Manchester. While the death-rate in London during February, as above stated, did not exceed 19·7 per 1,000, it averaged 21·2 in the twenty-seven provincial towns. The 13,783 deaths from all causes in the twenty-eight towns during the four weeks of February included 1,654 which were referred to the principal zymotic diseases, of which 492 resulted from whooping-cough, 347 from scarlet fever, 312 from measles, 157 from different forms of 'fever' (principally enteric), 155 from diarrhœal diseases, 125 from diphtheria, and 66 from small-pox. These 1,654 deaths were equal to 12·0 per cent. of the total deaths, and to an annual rate of 2·46 per 1,000. This zymotic death-rate showed a further decline from those which were recorded in these towns in the three preceding months, which were 2·81, 2·71, and 2·62 per 1,000 respectively. The death-rate in London during February from the principal zymotic diseases was equal to 2·5 per 1,000, and slightly exceeded the average rate in the twenty-seven provincial towns, among which this zymotic rate ranged from 0·6 in Brighton, and 0·7 in Norwich and in Halifax, to 3·5 in Salford, 4·0 in Manchester, and 4·1 in Leeds. Measles caused the high zymotic death-rate in Salford and Manchester, and scarlet fever in Leeds. These three towns had shown the highest zymotic death-rates in the first month of this year.

Whooping-cough, as in January, was the most fatal zymotic disease in the twenty-eight large towns during the second month of this year. The death-rate from this disease, which had steadily increased in the four preceding months from 0·26 to 0·69 per 1,000, further rose during February to 0·73, which, though it exceeded the rate recorded in the corresponding month of 1883, was considerably lower than the rate of mortality from this disease in February 1882, which was no less than 1·78 per 1,000. In London the death-rate from whooping-cough was as much as 1·03 per 1,000; but in the twenty-seven provincial towns it did not average more than 0·48, but was equal to 1·08 in Manchester, 1·21 in Huddersfield, and 1·68 in Bolton. The rate of mortality from scarlet fever, which had been 0·84, 0·71, and 0·64 in the three preceding months, further declined to 0·52 during February, and was lower than the rate recorded in any month since July last, though it somewhat exceeded the rate from this disease in the corresponding month of either of the two preceding years. No death was referred to this disease during February in Brighton, Portsmouth, Norwich, Bristol, Derby, or Bolton; the rate of mortality from scarlet fever in the other towns ranged upwards to 1·12 in Manchester, 1·30 in Sheffield, 1·38 in Newcastle-upon-Tyne, and 2·67 in Leeds. In each month since the middle of 1883 the last-mentioned town has shown the highest rate of mortality from scarlet fever. The death-rate in London from this disease last month did not exceed 0·37 per 1,000, having shown a steady decline during the last four months. The rate of mortality from measles in the twenty-eight towns, which had been 0·69 and 0·57 per 1,000 in the two preceding months, further fell to 0·46 during February. The measles death-rate in London was 0·42 per 1,000, and was somewhat below the average rate in the twenty-seven provincial towns, among which it was equal to 1·27 in Portsmouth, 1·59 in Salford, and 1·70 in

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Oldham. The death-rate from 'fever' (principally enteric) did not exceed 0·23 per 1,000, and showed a further marked decline from the rates recorded in the three preceding months; it was considerably below the rate in the corresponding period of either of the two previous years, and lower than that recorded in any month since June 1883, when it was also 0·23 per 1,000. The fever-rate in London last month was equal to 0·23, and corresponded with the average rate in the provincial towns, among which it was equal to 0·51 in Nottingham, and 0·52 in Preston and in Newcastle-upon-Tyne. The death-rate from diarrhœal diseases differed but slightly from those recorded in the corresponding month of recent years. The rate of mortality from diphtheria, which had been 0·21 and 0·18 per 1,000 in the two preceding months, was 0·19 in February; this disease continues to be proportionally much more fatal in London than in the provincial towns; it caused 9 deaths in Hull, 7 in Liverpool, and 6 in Birmingham and Leeds. During the four weeks of February 66 fatal cases of small-pox were registered in the twenty-eight towns; of these, 21 occurred in Sunderland, 18 in London, 17 in Birmingham, 6 in Liverpool, 1 in Wolverhampton, 1 in Manchester, 1 in Sheffield, and 1 in Newcastle-upon-Tyne. During the past eight months no fewer than 139 deaths from small-pox have been recorded in Birmingham. Judged by the returns of the Metropolitan Asylum Hospitals, the prevalence of small-pox in London during February showed a further increase; the number of small-pox patients under treatment in these hospitals, which had steadily risen in the four preceding months from 41 to 110, further increased to 132 at the end of February, exceeding the number at any period since July 1882. The average weekly number of new cases admitted to these hospitals, which in the two previous months had been 23 and 18, rose again to 21 during February.

The rate of infant mortality in the twenty-eight towns, measured by the proportion of deaths under one year of age to births registered, was equal to 138 per 1,000 during February, which almost corresponded with the very low rate in these towns in the second month of last year. The rate of infant mortality in London was equal to 134 per 1,000 births, and was 8 per 1,000 below the average rate in the twenty-seven provincial towns, among which it ranged from 80 in Portsmouth, 95 in Huddersfield, and 102 in Birkenhead, to 172 in Preston, 191 in Oldham, and 192 in Nottingham.

The death-rate from diseases of the respiratory organs, judged by the metropolitan returns, was considerably below the average. The weekly number of deaths referred to these diseases in London during February averaged 340, and the annual death-rate was only 3·5 per 1,000, against 9·9 and 5·1 in the corresponding months of 1882 and 1883. In Liverpool the annual rate of mortality from these diseases was last month equal to 5·4 per 1,000.

The causes of 336 of the 13,783 deaths registered in the twenty-eight towns during the four weeks of February were not certified, either by registered medical practitioners or by coroners. These uncertified deaths were equal to 2·4 per cent. of the total deaths, which showed a further slight decline from the proportions in recent months. In London the proportion of uncertified deaths did not exceed 1·3 per cent., whereas in the twenty-seven provincial towns it averaged 3·4. Only one death was uncertified during the month in Brighton, in Portsmouth, in Norwich, in Plymouth, and in Derby; whereas the proportion of uncertified deaths was equal to 6·3 per cent. in Sheffield, 7·5 in Wolverhampton, and 8·3 in Halifax.

Among the population living in the outer ring of suburban districts around London, estimated at rather more than a million persons, the annual death-rate from all causes during February was equal to 16·7 per 1,000, against 21·5 and 17·1 in the corresponding periods of 1882 and 1883. During the four weeks ending the 1st inst., 66 fatal cases of whooping-cough, 27 of 'fever' (principally enteric), 25 of scarlet fever, 22 of diphtheria, 22 of measles, 7 of diarrhœa, and 2 of small-pox, were recorded in the outer ring. These 171 deaths from the principal zymotic diseases were equal to a rate of 2·1 per 1,000, against 1·9 and 1·5 in the two preceding months. The fatality of scarlet fever, measles, whooping-cough, and 'fever' showed an increase, while that of diphtheria showed a decline from that which prevailed in the preceding month. In the district of West Ham, 14 deaths from whooping-cough, 12 from measles, 12 from scarlet fever, and 8 from fever were recorded during the month. Of the 2 fatal cases of small-pox registered in the outer ring during February, one occurred in Croydon and one in West Ham. Six deaths were referred to diphtheria, and 14 to whooping-cough in the district of Edmonton.

SPECIAL REPORTS.

ACADEMY OF MEDICINE IN IRELAND.

Sub-Section of Public Health.

A meeting of the Sub-Section of Public Health was held on Thursday, February 14, at the College of Physicians; Dr. Grimshaw, Registrar-General of Ireland, president of the Sub-Section, in the chair.

Dr. Duffey acted as secretary in the absence of Dr. Woodhouse.

The Presidential Address.

The President delivered an address, reviewing the Parliamentary work of the past year in connection with public health and social questions, and giving his views on pending measures of a kindred nature.

On the motion of Dr. Cameron, seconded by Dr. J. W. Moore, a vote of thanks to the President for his address was passed by acclamation.

State Control for Chronic Inebriates.

Dr. H. C. Tweedy read a paper on 'State Control for Chronic Inebriates,' a question which has been steadily gaining ground since it was first mooted in 1855. The subject, he said, was beset with difficulties, there being in the minds of many a deeply-rooted prejudice against any measures that would interfere with the liberty of the subject, or afford unprincipled persons an opportunity of putting troublesome relations out of the way. In answer to the first objection, it was urged that the rights of individuals should occupy a secondary place in reference to the peace and well-being of the community. Dipsomania was a form of insanity, as evidenced by the utter absence of moral sense, self-control, and self-respect, combined; while duplicity and cunning characterised the diseased. The process of self-destruction was slow but sure, and practically might be considered as a species of suicide. In answer to the second objection, he submitted there was no greater danger of unjust detention for the inebriate than for the lunatic. It was exceedingly improbable that two medical men of integrity would lend themselves as accomplices to such a fraud. Having sketched the history of the movement from its origin down to the Habitual Drunkards Act, 1879, he summarised the three reports of the Inspectors of Retreats for 1880, 1881, 1882, showing that since the passing of the Act only three retreats licensed under its provisions had been opened; and of these one was now closed, while the number of patients admitted in the three years was fifty-two for the whole of the United Kingdom. The weak points in the Act were:—1. Its purely permissive character, inebriates having under its provisions to give the necessary permission for their own detention. 2. The absence of any provision for the detention of paupers. The tariff in the existing institutions being three to four guineas a week, each patient, and in the Dalrymple Home 1*l.* 11*s.* 6*d.*, Poor Law Guardians declined to contribute on the ground that their duty was to provide for the relief

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of the poor and not for their moral improvement. 3. The limitation of the Act to ten years and the exclusion of the proprietors of lunatic asylums from obtaining licences to receive patients under the Act, thereby placing an effectual barrier to private enterprise in founding retreats. An Act partly permissive and partly compulsory would be more likely than the present to effect good, as many patients would voluntarily submit to treatment if the threat of compulsion were held over them *in terrorem*. Unnecessary publicity would be avoided by the appointment of a committee consisting of the nearest of kin, two physicians, and a magistrate with summary jurisdiction. Early treatment, so essential for cure, could thus be secured as well as by three convictions for drunkenness within six months proposed by the late Dr. Dalrymple. Detention should be 'until cured,' or for a period of at least twelve months.

Dr. Duffey said nobody was more cognisant of the defects of the Act referred to than the member for Glasgow himself who had introduced it in the House of Commons. Unfortunately, in its passage through the House of Lords it had been considerably emasculated. The real defect in the Act was its limitation to ten years ; for it would be absurd to suppose anyone would spend money in starting an institution on the probability of the measure being renewed by Parliament. That was why Dr. Cameron and others had started the Dalrymple Home. If the 'Homes' could be placed under the same management as existing institutions for lunatics, they would probably be sufficiently numerous throughout the kingdom.

Dr. Henry Kennedy remarked that in the results reported from America he did not hear of any cases that were really cured, and he invited explanation as to whether or not there had been any absolute cures after a year's confinement. The association of inebriates with the inmates of a general lunatic asylum would have a prejudicial effect, as people would not go into a place where there were lunatics. Medical men in practice knew that the number addicted to drink was exceedingly great, and it was lamentable to see persons likely to be benefited allowed to follow their own vicious instincts. He had seen men recover, but in no case a woman who had fallen into the degrading vice. The subject of their treatment was, however, surrounded with considerable difficulty.

Dr. Cameron agreed that every facility should be given for the reclamation of the habitual drunkard, but there had been a little exaggeration of the results of habitual drinking. Dr. Tweedy had represented an authority as stating that 75 per cent. of the crime committed by the prisoners in a certain gaol was due to intemperance. No doubt it often happened that drunkards were thieves and robbers and murderers, but it was simply a coincidence that a man who was a robber, a burglar, or a murderer, should also be a drunkard. That 75 per cent. of the persons committed to prison drank was highly probable ; but it was equally probable that 75 per cent. of the persons not committed to prison drank too. Were it not so, how could the public-houses be kept ? With regard to the numerous plans proposed for the cure of intemperance, he did not think that the voluntary system would have the desired result.

The President, in confirmation of Dr. Duffey's remarks, said the most important provisions of the Bill were destroyed, some, no doubt, in the House of Commons, but the principal in the House of Lords ; and its failure was mainly due to the limited period of its operation. As pointed out, nobody would put money into a concern that would last only ten years. The great success of some of the institutions in America was due to the fact that compulsory and voluntary seclusion were combined. Those who did not choose to go in ran the chance of being put in by their people. As a member of the commission on prison dietary, he visited a great number of prisons in Ireland, and he was astonished at the number of persons confined for crimes which had been produced directly or indirectly by drink. Touching the question of compulsory confinement for drunken habits, he saw in a gaol in the north of Ireland a woman who was in for the 235th time merely for drunkenness. She was a 'bail prisoner,' that is, imprisoned in default of finding bail for good behaviour. Instead of imposing the smaller penalties incurred on conviction for drunkenness, this was the side-wind adopted by the Belfast magistrates for keeping drunkards under control. The woman in question was a lunatic, and ought to be treated as such. She herself said she was sure to get drunk when she went out, and her great desire was to stay in prison. Though not under a sentence compelling her to work, she worked as a matter of liking, and kept herself neat and tidy. It was an outrageous state of the law that she should be treated as a criminal when she was really a lunatic. Having given an example of a dipsomaniac in the upper ranks of life, he said unless means were taken to deal with the disease, the number of dipsomaniacs would steadily increase, believing, as he did, in hereditary dipsomania.

Dr. Tweedy, in reply, said he had not alluded to the voluntary system as a defect, but he meant to convey that the voluntary system, unbacked by any system of compulsion, was a radical defect in the Act. Of course, the limitation of the operation of the Act to ten years was a great objection. It was desirable to have retreats for dipsomaniacs, and he advocated the utilisation of lunatic asylums on the principle of using existing means until better were provided. Dr. Kennedy had rightly concluded that the number of cures in America was inconsiderable. In his own experience of individuals with this form of insanity he saw no permanent cure, except where very early treatment was adopted ; but there were no means of keeping dipsomaniacs under control for a proper period. Even supposing they were not perfectly cured, it would be important to get dipsomaniacs into an establishment where they would be improved. He agreed with Dr. Cameron that the individuals included in the 75 per cent. were guilty of a great number of other crimes besides drunkenness. In reference to the retreat at Kent, and the surreptitious introduction there of drink, Mr. Hoffman, in his second report in 1881, had mentioned that public-houses in the vicinity of retreats did not cease to give serious trouble to licensees whose establishments were without grounds to confine the inmates within bounds, or where they had not a trustworthy staff to prevent the introduction of drink.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the Society was held at 1 Adam Street, Adelphi, on Friday, Feb. 16, Dr. T. O. Dudfield in the chair.

The council presented reports upon :

1. Regulations under the 35th section of the Sanitary Act.

2. Letters recently addressed by the Local Government Board to local authorities on regulations as to houses let in lodgings, dwellings of labouring classes and Factory and Workshop Act, 1883.

3. Letter recently addressed by the Metropolitan Asylums Board to metropolitan medical officers of health on cholera.

4. Public Health (Dairies) Bill, 1883.

Some discussion arose upon the regulations as to houses let in lodgings, and it was decided that these as amended by the Society, should be issued with the statement that they had been prepared by metropolitan members for their use.

A paper entitled 'Remarks on the Examination of Water for Sanitary Purposes,' by Dr. B. A. Whitelegge and Mr. C. E. Cassal was read, and will be found on page 427.

The president, after thanking the authors of the paper in the name of the society, dwelt upon the importance of ascertaining the wholesomeness of waters.

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Dr. Thursfield regarded water analysis as a double-edged weapon; he had known cases in which the water was shown by the most conclusive evidence to be the cause of enteric fever, and yet as the result of chemical analysis, in the hands of a competent analyst, it had been stated to be perfectly good.

Dr. Thomas Stevenson thought chemical analysis must always be open to some doubt; evidence of much pollution was easily obtained, but small amounts of specific matter were not recognisable. Microscopic examination was not very reliable; the sewage fungus had also been found in warm sulphur springs.

Mr. Wynter Blyth said too much value should not be attached to any one method; in addition to chemical analysis, he always submitted waters to the biological test. Sewage fungus can always be developed in from twenty-four to forty-eight hours in sterilised syrup; it is never absent in impure water, but sometimes present in pure. He described the method of estimating the wholesomeness of water agreed upon by the Society of Public Analysts—viz., giving a definite value to the appearance, odour, microscopical characters, chlorine, nitrates, &c., of water.

Dr. Tripe noted that chemical analysis failed to discriminate between harmless and injurious organic compounds, and gave an account of an outbreak of diarrhœa produced by water in his district. In this case Mr. Wigner found mycelium threads in the water; he thought sufficient value did not attach to microscopic evidence.

Mr. Shirley Murphy expressed surprise that the Society of Public Analysts should have approved the method described by Mr. Blyth and characterised it as unscientific.

Dr. Edmunds said that waters were of three classes, one so much polluted that the nature of pollution did not matter; the second appeared pure, but yielded a tolerable quantity of albuminoid ammonia, and, when tinged with permanganate of potash, the colour remained unchanged for many hours; here the water might be accepted. The third was not obviously polluted, but would not stand these tests, and, if dangerous, the organic matter was living germinal, and of a particulate character. The microscope would only be of service if it would settle this point.

Mr. Cassal and Dr. Whitelegge replied, and the Society adjourned.

THE NATIONAL HEALTH SOCIETY.

The eleventh annual report of the National Health Society, which was read on the 4th inst. at the Society's rooms, 54 Berners Street, W. (Mr. Robert Farquharson, M.P., in the chair), shows that the Society has carried on its work during the past year in a most practical manner. Hundreds of lectures on sanitary subjects have been delivered not only all over the poorer parts of London but in provincial towns, to large audiences of working men and women, classes of girls, district visitors, and others engaged in work amongst the poor. The Society is much encouraged by the practical results of their lectures on—keeping the house healthy; rearing of infants; prevention of the spread of infectious diseases; preparation of food, and kindred subjects, a knowledge of which is so much needed in our densely-crowded neighbourhoods.

The question of poisonous dyes in domestic fabrics; of dust collection; of smoke abatement, and the prevention of cholera, have been investigated and reported upon by special committees appointed for the purpose.

The Metropolitan Public Gardens and Playgrounds Association, which is in connection with the National Health Society, has been most active in assisting to open spaces for recreation in crowded parts of London, as well as in placing seats and planting trees in convenient situations.

The Health Exhibition held by the Society last June was commented upon at the meeting, and the Secretary stated that more than one hundred members had joined the Society during the year.

THE MANSION HOUSE COUNCIL ON THE DWELLINGS OF THE POOR.

This Committee, which was appointed by a Public Conference held last December, has already made so great progress as to exceed the most sanguine expectations of its supporters. The Council were early convinced that the best efforts for the amelioration of the condition of the poor were those directed to arousing a sense of self-respect and a love of decency and order in the people themselves, which, although known to exist, were too often dulled by the force of distressing surroundings. So that, while keeping in view the main object of enforcing the existing laws so far as they relate to the sanitary condition of houses, the Council have proceeded to form Local Sanitary Aid Committees consisting of ladies and gentlemen, who, in their respective districts, are best acquainted with the requirements of the poor, and the defects in the dwellings in their neighbourhood. The whole of the metropolitan area has been divided into districts, each having its Committee of twenty to thirty members, who find out the exact condition of the dwellings in their district, and also report the nature of the occupation of the inhabitants themselves. The executive officer of the Council regularly visits the Local Committees, who also each month report to the Council the number of cases in hand, the method of treatment, and the results obtained. At present there are eighteen Local Committees in full working order—viz., Paddington, Lambeth, Hampstead, Whitechapel, St. George's-in-the-East, Bishopsgate, North Holloway, North Marylebone, East Marylebone, West Marylebone, Clapton, Holborn, East Greenwich, St. Pancras, Camberwell, St. James and Soho, Stoke Newington, and Fulham. Other Committees will shortly be formed in the remaining districts of London. The Council meet at the Mansion House every fortnight, or oftener if required, to receive reports and to affiliate new Committees. To illustrate the practical nature of the work, and the advantage of the system in operation, it may be mentioned that one Committee has dealt with more than 130 cases, and two others with nearly 80 cases. The Council being in possession of complete lists of every class of workers among the poor, the Local Committees are enabled to avail themselves of all existing means of carrying out their operations. The plan on which the Local Committees work is to circulate papers giving information as to what are sanitary defects, and inviting complaints from all who may know of any. The complaint, on being received, is investigated by a member of the Committee and reported to the whole Committee if the facts are as stated; a complaint is then forwarded to the proper authority, and, the case being set right, is dismissed. But should the Local Committee from any cause be unable to remedy the matter, and further measures be needed, it is reported by the Local Secretary to the Council, who take the necessary steps for the removal of the nuisance. The Council have been greatly encouraged by the warm support they have received from the clergy and ministers of all denominations, who in many instances are placing at their disposal rooms for the meetings of Local Committees free of cost. The great questions of rebuilding and rehousing the poor have not been neglected by the Council, who are considering several carefully-devised schemes. The Council are likely to be of great service to persons desirous of purchasing bad property with the object of converting it into habitable dwellings. By receiving and diffusing information on these points the Council hope to be the means of replacing some of the most objectionable of the slums by buildings of a healthy character at rentals within the power of the poorest to attain.

Contributions to the funds of the Council, which are entirely voluntary, will be gladly received.

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THE CREMATION SOCIETY OF ENGLAND.

THE following circular has just been issued by the Cremation Society of England, and it will be observed thereby that the reformed rite is not at all in danger of being lost in oblivion. The circular runs as follows:—The council of the Cremation Society of England purchased, in the year 1878, a freehold site at St. John's, Woking, in Surrey, especially adapted by position for the purpose, and erected thereon a building, with an apparatus of the most approved kind for effecting cremation of the dead. They next tested it by experiment, and found that it accomplished the purpose required without occasioning nuisance of any kind. Since that time the place has been maintained in perfect order, but has not been used, owing to a doubt raised, soon after the date referred to, as to the legality of adopting the process at present in this country.

A recent decision, however, of Mr. Justice Stephen declares that the cremation of a dead body, if effected without nuisance to others, is a legal proceeding. (See page 455.) Under these circumstances the Cremation Society feel it a duty to indicate, without delay, those safeguards which they deem it essential to associate with the proceeding in order to prevent the destruction of a body which may have met death by unfair means. They are aware that the chief practical objection whiah can be urged against the employment of cremation consists in the opportunity which it offers, apart from such precautions, for removing the traces of poison or other injury which are retained by an undestroyed body.

The following, therefore, are the conditions on which the employment of the crematorium will alone be permitted by the council:—1. An application in writing must be made by the friends or executors of the deceased—unless it has been made by the deceased person himself during life—stating that it was the wish of the deceased to be cremated after death. 2. A certificate must be sent in by one qualified medical man at least, who attended the deceased until the time of death, unhesitatingly stating that the cause of death was natural, and what that cause was. 3. If no medical man attended during the illness, an autopsy must be made by a medical officer appointed by the society, or no cremation can take place. These conditions being complied with, the council of the society reserve the right in all cases of refusing permission for the performance of the cremation, and, in the event of permitting it, will offer every facility for its accomplishment in the best manner.

Signed on behalf of the executive council,
Wm. EASSIE, C.E., Hon. Secretary.
To whom communications may be addressed.
11 Argyll Street, Regent Street, W.
March 1884.

THE LAW AS REGARDS CREMATION.

MR. JUSTICE STEPHEN, when charging the Grand Jury at the Glamorganshire Assizes, Cardiff, referred at length to the case of Dr. Price, the Welsh Druid, charged with unlawfully attempting to burn the body of his infant child, and with neglecting to give notice to the coroner of its death. He stated that Lord Justice Fry agreed in the views about to be expressed by him, and he reviewed elaborately all the authorities bearing on the case, traced the history of burial, and pointed out that formerly it was regarded as a privilege to which all members of the Church were entitled, subject to certain conditions, deprivation thereof being posthumous punishment akin to excommunication of the living. He referred, also, to the practice of anatomy as an exceptional method of disposing of dead bodies regarded as not illegal, and concluded his observations with the following remarks. 'After full consideration, I am of opinion that a person who burns instead of buries a dead body does not commit a criminal act unless he does it in such a manner as to amount to a public nuisance at common law. My reason for this opinion is, that, upon the fullest examination of the authorities, I have, as the preceding review of them shows, been unable to discover any authority for the proposition that it is a misdemeanour to burn a dead body, and, in the absence of such authority, I feel that I have no right to declare it to be one. There are some instances, no doubt, in which courts of justice have declared acts to be misdemeanours which had never previously been decided to be so, but I think it will be found that in every such case the acts involved great public mischief or moral scandal. It is not my place to offer any opinion on the comparative merits of burning and burying corpses, but, before I could hold that it is a misdemeanour to burn a dead body, I must be satisfied, not only that some people object to the practice, but that it is on plain undeniable grounds highly mischievous or grossly scandalous. Even then I should pause before I held it to be a misdemeanour, but I cannot take even the first step. Sir Thomas Browne finishes his famous essay upon burial with a quotation from Lucan, which, translated into English, means whether decay or fire destroys corpses matters not; the difference between the two processes is only that one is quick, the other slow. Each is so horrible that every healthy imagination would turn away from its details, but one or the other is inevitable, and each may be concealed from observation by proper precautions. There are, no doubt, religious considerations and feelings connected with the subject which every one would wish to treat with respect and tenderness. I suppose that it is a matter of historical fact that the disuse of burning bodies was due to the force of those sentiments. I do not think, however, that it can be said that every practice which startles or jars upon the religious sentiments of the majority of the population is for that reason a misdemeanour at common law. The statement of such a proposition in plain words is a sufficient refutation of it, but nothing short of this will support the conclusion that to burn a dead body must be a misdemeanour. As for the public interest in the matter, burning, on the one hand, effectually prevents the bodies of the dead from poisoning the living; on the other hand, it might, no doubt, destroy the evidences of crime. These, however, are matters for the Legislature and not for me. The great leading rule of criminal law is that nothing is a crime unless it is plainly forbidden by law. This rule is, no doubt, subject to exceptions, but they are rare, narrow, and to be admitted with the greatest reluctance, and only upon the strongest reasons; though I think that to burn a dead body decently and inoffensively is lawful, or at the very least not criminal, it is obvious that if it is done in such a manner as to be offensive to others, it is a nuisance and one of an aggravated kind.'

INTERNATIONAL HEALTH EXHIBITION, 1884.

PREPARATIONS for the holding of this Exhibition are proceeding rapidly. The Board of Trade have certified that the Exhibition is an International Exhibition, and exhibitors thereat will accordingly participate in the privileges accorded by the Patents, Designs, and Trade Marks Acts of 1883. The officers of Her Majesty's Customs have also announced that the Lords of the Treasury have consented to the buildings being considered as a bonded warehouse during the continuance of the Exhibition, as was the case at the late Fisheries Exhibition. The General Committee now numbers nearly 400 members, and from these seventeen sub-committees have been formed. These have all been doing valuable work in advising the Executive Council as to the nature of objects which it is desirable should be fully illustrated, in obtaining the co-operation of many persons of eminence in the various branches on which the Exhibition will treat, and in supervising the applications for space. The allotment of space, which has been largely applied for, is being rapidly proceeded with; and applicants will soon be informed of the decision of the Executive Council with regard to their

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applications. Though it is impossible to state at this early stage of the preparations the names of exhibitors, we are, however, in a position to say that many well-known London and provincial firms—whose very names are a guarantee that their exhibits will be prepared in a first-rate manner—have announced their desire to take part. In response to a request made by His Royal Highness the Prince of Wales, President of the Exhibition, the eight Water Companies of London have resolved to exhibit, in a pavilion which is being erected for them, their appliances for the supply, filtration, &c., of water, together with diagrams showing the various processes and localities; and a powerful sub-committee, under the active chairmanship of Colonel Sir Francis Bolton, has been formed to carry out this branch of the exhibition. The Water Companies have also determined to put up in the grounds a large fountain, which will be illuminated at night by electricity. This fountain of light will, it is anticipated, materially add to the beauty of the illumination of the gardens. It is impossible, as yet, to give any definite information with regard to foreign countries; but, so far as one can judge at present, Belgium, China, and India will be the best represented. A Royal Commission has been appointed in Belgium, and the Consul-General in London is their active representative here. To China has been allotted the space which it occupied last year at the Fisheries Exhibition, and a Chinese tea garden, restaurant, and shop will not be the least interesting objects in the Exhibition. India is to be adjacent to China, and strenuous exertions are being made to secure the united action of many of the principal tea planters in India, so as to insure a good and representative show of the Indian tea-growing industry.

The King of Italy has given a private audience to Mr. Ernest Hart and Mr. Acton, on the subject of the London International Health Exhibition. His Majesty entered at considerable length into the subject of the housing, feeding, and clothing of the people, and of the sanitary progress now being made throughout Italy. He expressed a desire that it should be known that he took the liveliest interest in the approaching Exhibition, and that he intended to do all in his power to have Italy worthily represented at it. The Municipality of Rome have voted £800 towards the expenses of the Italian exhibit.

M. Hérisson, Minister of Commerce, has appointed a committee to provide for the participation of France in the International Hygienic Exhibition which is to open in London on May 1. M. Wurtz, Senator, is its president, and among the members are Dr. Fauvel, Inspector-General of Sanitary Services; M. Nicolas, Director of Foreign Commerce; M. Jacquemart, Inspector-General of Technical Education; and Dr. Proust, President of the Society of Public Medicine.

METEOROLOGICAL.—GROUP V. A.

It is desired to illustrate, as far as possible, the relations of meteorology to health, and for this purpose a special sub-committee has been formed.

It is hoped that the Royal Meteorological Society will establish a Typical Climatological Order Station, provide the complete equipment, and supervise the same. This will be arranged on a level grass space about thirty feet square, which space will be railed in, and provided with a gate through which a limited number of the public can, from time to time, be admitted.

The attendant will take daily observations from the instruments, which will be exhibited in diagrams, and a copy of them furnished to the Editorial Department of the Exhibition, for publication in the daily programme and also as a communiqué to the Press.

It is hoped that a series of large diagrams illustrative of the climatal conditions prevailing in various parts of the world may be exhibited.

Besides the collective exhibit above described, space will be provided for the exhibition of instruments by manufacturers, inventors, and others, who may desire to show them. Attention is particularly directed to the fact that the committee specially invite the exhibition of meteorological interests bearing upon the relations of climatology to public health.

The committee also appeal to authors of papers upon the relations between health and disease, rainfall, percolation, evaporation, and flow from the ground, and other subjects embraced by the Exhibition, and invite them to exhibit diagrams, models, and apparatus illustrative of their researches.

It should be borne in mind that instruments which are not considered to come within the scope of the Exhibition, as bearing on the relations between meteorology, climatology, and health, will not be held admissible.

Among those which it is considered desirable to show may be mentioned barometers, aneroids, thermometers, earth thermometers, thermometer stands, hygrometers, anemometers, airmeters, rain gauges, automatic meteorological apparatus, sunshine recorders, evaporation gauges, ozone papers, and ozonometers.

Makers are requested to confine their exhibits for the most part to instruments of their own manufacture, and not to multiply examples of identical, or nearly identical, instruments.

THE ARTISANS' DWELLINGS ACT IN DEVONPORT.

AT a recent meeting of the Devonport and Stonehouse Junior Liberal Association, the President (Mr. R. W. B. Welch) presiding, Mr. Josiah Clarke read a paper on 'The Artisans' Dwellings Act and its Application to Devonport.' In the course of his remarks he said the sad and horrible condition into which the very poor people of the country had been crushed had for some time been a source of painful consideration to all thoughtful persons. One of the means devised for helping them out of their deep degradation and misery was the Artisans' Dwellings Act. The Act was good in its object, but its effects were very different. Its main principle was apparently cheap good houses for the working-classes, but this had been lost sight of, or made subservient to a consideration of the rights of the holders of property, of such character as deserved no consideration whatever. Persons guilty of letting at high prices houses unfit for human habitation were able to get more than the value of the property from public bodies buying them up, and, consequently, the Act had become practically a failure, and the results of the experience of the measure in Devonport showed the need of more sincere action on the part of the Legislature. Cruel hardship and suffering had been caused by the carrying out of the Act, and it was sad to hear the tales of misery and suffering brought on large numbers of people by the pulling down of their dwellings before suitable substitutes had been provided. One man had told him that he knew of many poor persons who had had to get away into old unused cellars and lumber holes which were let to them at a weekly rental. In the worst parts of the town the rents of hovels had gone up in consequence of the demand for shelter, altogether of the worst kind, for these people. The only way to make the Act a great source of benefit to a town like Devonport was to remove its restrictive application, and by adding to its provisions a clause to the effect that cheap and good houses should first be erected on unencumbered land. It had been stated that to take over the ground and interests of the three acres comprised in the area of the A.D. scheme would require an outlay on the part of the town approximately of 28,000*l*. If three acres before a stone was laid on the land for building would cost that amount, it was an absurdity to talk of cheap houses there. But if it had been left with the Urban Authority to buy land where they pleased without being compelled to go to this 'gold field,' they might have selected within fifteen minutes' walk three acres of ground for less than 2,800*l*., and for many less hundreds than this old rookery would cost in thousands, houses adapted

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for the working classes might have been erected. If cheap houses were required, and there was a sincere desire to build houses for people with low wages, the Act should not be restricted to old and dilapidated localities. On the three acres which had been cleared stood about 170 houses, and these would be replaced within fourteen years by seventy-eight houses of a character altogether unsuited to the poor. The people who were crowded there to the number of nearly a thousand were obliged to find habitations as best they could, thus causing rents to rise in other parts of the town.

GLASGOW SANITARY PROTECTION ASSOCIATION.

At the second annual meeting of members of the Glasgow Sanitary Protection Association—Sir James Watson presiding—the report by the council contained the following :—

'The period now reported on is for nine months—viz., from Dec. 31, 1882 (the date of our last report), to Sept. 30 last. Our membership at Dec. 31, 1882, as stated in our last report, was 188 ; from Dec. 31 to Sept. 30 last there have joined 127—total membership at Sept. 30, 1883, 315. A considerable portion of our engineer's work has been done outside Glasgow, and during the year about thirty country houses in various districts have been examined and reported on. It is anticipated that in the present year this branch of our work will be largely increased. During the nine months now reported on, 217 houses were examined for the first time. Ninety-seven were found to have actual leakages in the pipes, through which foul air, and in many cases sewage, was escaping. The defects varied from badly-made joints to cases in which the drain was completely choked, or others in which some lengths of pipe in the underground drain were wanting, leaving a mass of sewage matter under the floor. In numerous cases where the tests merely showed that the drain was not gas-tight it was found on opening that neither was it water-tight, the joints being made by a little cement on the top, the bottom being quite open. It was frequently found that in such cases sewage had been leaking freely from these openings and spreading into the soil. Besides these defects in workmanship, a large number of cases were found where, through bad design, traps were useless, and gas from the drains had often free access to bath-rooms and even to bed-rooms. A number of cases of illness were completely accounted for by the condition of the drains. Our membership at the beginning of February 1884 was 226, 184 old members having renewed their subscriptions and forty-two new members having joined. The council have pleasure in stating that the association is making progress towards financial success.'

The chairman said : In moving the adoption of the report, I have the best authority for saying that the greater proportion of the houses in our city are in a most unsatisfactory state as regards sanitary arrangements. There are cesspools which have not been cleaned out for years. There are choked drains with traps that have become unserviceable ; there are pipes with joints broken and parts decayed, so that there is more passing under than through these pipes, all emitting their deadly gas to the unconscious households. The effects of such a state of things must be to give rise to fever, or, if not to fever, to lower the system, and to produce such depression that when attacked by disease the patient is in a very unfit state to stand it. Only a few houses in the West End have as yet been redrained. The result in nearly the whole of these cases has been to discover the drains choked and the ground a perfect swamp of impure matter. Even in a new house in Hillhead, which had not been previously occupied, the drains were found to be in such a state that the family had to remove till the house was made tenantable. I can speak from experience when I say that I believed I was living in a healthy house, but a careful inspection showed me I had been living in a fool's paradise. Thanks to the Sanitary Protection Society for awakening me to the fact.

Mr. Honeyman said he could confirm, from personal observation, all the remarks of the chairman in regard to the very defective state of the drainage connected with the great majority of the houses in Glasgow.

WOLVERHAMPTON SANITARY PROTECTION ASSOCIATION.

The following is an abstract of the annual report read at the annual public meeting of the Wolverhampton Sanitary Protection Association.

The association has now forty-seven members ; this shows a net gain of ten members, notwithstanding that several have left during the year. Most of the authorities connected with the public institutions and private schools in the town have recognised the benefit likely to accrue to the occupiers by placing the sanitary arrangements of the buildings in their charge under the supervision of the association. Among these may be mentioned the General Hospital, Tettenhall College, Eye Infirmary, St. Peter's Schools, Conservative Club, &c. The first object of the association is to provide members at moderate cost with such advice and supervision as shall ensure the proper sanitary condition of their own dwellings. With this object original inspections have been made of fifty-three buildings. In the greater number of cases the inspections have been fully justified by the discovery of some one or more defects of construction or workmanship. The work of the plumber and builder being no exception to the rule that all work is liable to derangement and decay, the society provides for the annual inspection of the houses of members, but, although twenty-one dwellings have been inspected for a second and some for a third time, it is satisfactory to report that where the first recommendations have been fully carried out no serious fault has been discovered and therefore no great additional expense incurred. Yet in one or two instances defects have been found which if not then discovered might have proved a source of danger. With each report a sketch plan of the drains is made, which is extremely useful for future reference. The second object of the association, to enable members to obtain practical advice on moderate terms as to the best means of remedying defects in houses of the poorer class in which they are interested, has met with no response, and although the poorer class of dwellings in this town, as in most others, are in a highly nnsatisfactory condition, it cannot be a matter of surprise that people who are practically indifferent to the healthiness of their own houses should not take much interest in the houses of others. The third object is to aid in improving the sanitary condition of the town. Each member by putting his own house in order has done something towards this end, and perhaps the good done has not altogether been limited to members, but has drawn the attention of plumbers, builders, and householders to the need of more careful attention to sanitary details. The association has a balance in hand of *1l.* 19*s.* 3*d.*

THE SANITARY USE OF PERFUMES.

In an interesting lecture on this subject, recently delivered by Mr. Eugene Rimmel at St. James's Hall, he referred to the production by certain essential oils of peroxide of hydrogen, which, in contact with the atmosphere, disengages ozone—the great air purifier. The lecturer pointed out that Schönbein was the first to discover that essence of turpentine through that process could generate ozone. Dr. Bond pushed his researches further ; and by treating turpentine with sulphuric acid he obtained a volatile substance which he called 'Terebene,' which is certainly an excellent deodoriser. Its own odour, however, is scarcely pleasant enough to be accepted as a welcome substitute for the one it displaces ; and, considering a similar result with essential oils possessing an agreeable smell can be

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obtained, the lecturer was of opinion that there can be no hesitation in preferring the latter.

The essences he would chiefly recommend are the eucalyptus, lavender, rosemary, thyme, peppermint, and pennyroyal.

Eucalyptus is the most powerful of all, owing to its prophylactic effects and its extremely volatile nature. It is yielded by the leaves of that Australian tree, of which there are many varieties, the chief ones being the *E. globulus*, the *E. amygdalina*, the *E. odorata*, the *E. citriodora*, and the *E. dumosa*. Since its introduction into the south of Europe and Algeria it has rendered important services, possessing the double property of driving away fevers and benefiting the respiratory organs. In fact, it is called in its native land 'the health-giving tree.' Consumptive patients are sent to reside in the vicinity of eucalyptus forests, and fever-stricken districts are rendered sane by being planted with those trees. A series of the essential oils distilled from those *Eucalypti* was shown for the first time in Europe at the International Exhibition of 1862. Being a juror in the perfumery class, Mr. Rimmel discovered them in the Victoria section, and was struck with their pungent and pleasant odour. They were then only presented as substitutes for turpentine in dissolving paint, and were priced at *2s. 6d.* per gallon. He thought, however, they could be turned to a more profitable account by using them to perfume ordinary soap, and having made some satisfactory experiments, he drew special attention to this fact in his official report. This induced Australian distillers to make large quantities of those oils and send them to this country, where they are now selling at more than twelve times the price at which they were originally quoted.

Since that time Dr. Carlotti, Dr. Lorinser, Dr. Sicard, Dr. Tristani, Dr. Keller, Dr. Gimbert, Dr. Day, and many other men of science have studied the eucalyptus from a medical point of view, and derived many internal remedies from it. Being convinced that inhalations are equally conducive to health, Mr. Rimmel has made eucalyptus the chief basis of his 'Aromatic Ozonizer,' a powder which, he asserts, in the course of evaporation disengages a quantity of ozone and renders the closest atmosphere pure, fresh, and pleasant.

Toilet waters can likewise be ozonized by Dr. Day's process, which adds much to their antiseptic and exhilarating effect. They are used either on the handkerchief or sprinkled on a pad, which is hung up in closets, sick-rooms, &c.

The lecturer then went on to indicate that aromatic fumigations are also pleasant and useful. The ingredients contained in them are about the same whether they are offered in the shape of either pastilles, papers, or ribbons, namely, fragrant gums and balsams, with flavouring to taste.

Mr. Rimmel has also invented another way of perfuming the atmosphere rapidly and effectually by a jet of steam loaded with odorous particles, produced by a neat little apparatus which has been figured in our columns, and is called the Perfume Vaporiser.

Passing to another branch of his subject, the lecturer stated that the Hindoos, Malays, and Chinese have been for centuries in the habit of using fragrant flowers, plants, and roots for a number of ailments, which he had an opportunity of ascertaining personally at various exhibitions, the last being the one held at Amsterdam. It contained a superb collection from the Dutch East Indies, including the famed *Minoak Cajou-poeti*, the fragrant oil of Cajeput, which the Javanese consider as the best specific for cholera, and the *Minoak Pocca*, a few drops of which rubbed on the eyebrows dispel at once the most violent headache. In a like manner the Jamaica negroes bind round their aching head the aromatic leaves and flowers of the *Hedyosmum nutans*, which afford them instant relief.

There was at one time, Mr. Rimmel remarked, a great trade for medicinal flowers and herbs in London, and Bucklersbury was the centre of it, hence the expression in an old play, 'smelling as sweet as Bucklersbury in simpling time.' Now things are much altered in England, and vegetable remedies have been in a great measure superseded by mineral ones, but in France and other Continental countries the rose, the violet, the orange, the lime or tilia, and many other fragrant flowers or leaves, are still much esteemed for their curative effects.

OVERCROWDING.

In a letter to a daily contemporary concerning overpressure of education at the London School Board schools in connection with over-pressure caused by poverty and drink, Mr. T. Marchant Williams, Inspector of Schools, gives some statistics of overcrowding in the City division, comprising nearly the whole of the Finsbury division and the greater part of the Marylebone division. These statistics are likely to be useful to our readers in the consideration of the question of housing the poor. We therefore give them a permanent record in our pages.

Mr. Marchant begins with the division of Finsbury, which includes the following parishes:—St. Giles-in-the-Fields, Bloomsbury, St. George the Martyr, St. Andrew, Holborn, Clerkenwell, St. Luke, Stoke Newington, and Islington, the population of the whole division in 1881 being 503,851. In (1) the parish of St. Giles-in-the-Fields, the number of families and persons residing (each) in one room only was as follows:—Two in family, 41 families, equal to 82 persons; three in family, 474 families, equal to 1,422 persons; four in family, 439 families, equal to 1,756 persons; five in family, 343 families, equal to 1,715 persons; six in family, 179 families, equal to 1,074 persons; seven in family, 81 families, equal to 567 persons; eight in family, 30 families, equal to 240 persons; nine in family, 5 families, equal to 45 persons; ten in family, 1 family, equal to 10 persons. Total, 1,593 families, equal to 6,911 persons.

Number of families and persons residing (each) in two rooms only:—Two in family, 12 families, equal to 24 persons; three in family, 148 families, equal to 444 persons; four in family, 199 families, equal to 796 persons; five in family, 145 families, equal to 725 persons; six in family, 136 families, equal to 816 persons; seven in family, 52 families, equal to 364 persons; eight in family, 51 families, equal to 408 persons; nine in family, 20 families, equal to 180 persons; ten in family, 5 families, equal to 50 persons. Total, 768 families, equal to 3,807 persons.

Number of families scheduled for elementary school purposes residing in more than two rooms, equal to 382, which represents about 14 per cent. of the whole number; 28 per cent. live in two rooms only, and 58 per cent. in only one room.

(2). In the Parishes of Bloomsbury, St. George the Martyr, St. Andrew, Holborn, and that section of St. Giles's which adjoins Tottenham Court Road, the number of families and persons residing (each) in one room only, was two in family, 140 families, equal to 280 persons; three in family, 528 families, equal to 1,584 persons; four in family, 455 families, equal to 1,820 persons; five in family, 308 families, equal to 1,540 persons; six in family, 146 families, equal to 876 persons; seven in family, 57 families, equal to 399 persons; eight in family, 10 families, equal to 80 persons; nine in family, 2 families, equal to 18 persons; ten in family, 1 family, equal to 10 persons. Total, 1,647 families, equal to 6,607 persons.

Number of families and persons residing (each) in two rooms only:—Two in family, 38 families, equal to 76 persons; three in family, 313 families, equal to 939 persons; four in family, 425 families, equal to 1,700 persons; five in family, 387 families, equal to 1,935 persons; six in family, 286 families, equal to 1,716 persons; seven in family, 125 families, equal to 875 persons; eight in family, 44 families, equal to 352 persons; nine in family, 13 families, equal to 117 persons; ten in family, 3 families, equal to 30 persons. Total, 1,634 families, equal to 7,740 persons.

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Number of families scheduled by the Board residing (each) in more than two rooms, equal to 395, which is about 10 per cent. of the total number of scheduled families; nearly 45 per cent. reside (each) in one room only, and about 45 per cent. in only two rooms.

(3.) In the lower division of Clerkenwell and St. Luke's the number of families or persons residing (each) in one room only was two in family, 400 families, equal to 800 persons; three in family, 1,127 families, equal to 3,381 persons; four in family, 742 families, equal to 2,968 persons; five in family, 472 families, equal to 2,360 persons; six in family, 284 families, equal to 1,704 persons; seven in family, 106 families, equal to 742 persons; eight in family, 32 families, equal to 256 persons; nine in family, three families, equal to 27 persons; ten in family, 4 families, equal to 40 persons. Total, 3,170 families, equal to 12,278 persons.

Number of families or persons residing (each) in two rooms only:—Two in family, 132 families, equal to 264 persons; three in family, 552 families, equal to 1,656 persons; four in family, 802 families, equal to 3,208 persons; five in family, 842 families, equal to 4,210 persons; six in family, 552 families, equal to 3,312 persons; seven in family, 296 families, equal to 2,072 persons; eight in family, 128 families, equal to 1,024 persons; nine in family, 58 families, equal to 522 persons; ten in family, 13 families, equal to 130 persons; 11 in family, one family, equal to 11 persons. Total, 3,376 families, equal to 16,409 persons.

Number of families residing in more than two rooms equals 3,886, which is about 37 per cent. of the total number of scheduled families: 30 per cent. reside each in one room only, and 33 per cent. in only two rooms.

(4.) In the Upper Division of Clerkenwell and St. Luke's the number of families and persons residing (each) in one room only was two in family, 47 families, equal to 94 persons; three in family, 142 families, equal to 426 persons; four in family, 24 families, equal to 96 persons; five in family, 18 families, equal to 90 persons; six in family, 18 families, equal to 108 persons; seven in family, 5 families, equal to 35 persons; eight in family, 5 families, equal to 40 persons. Total, 259 families, equal to 889 persons.

Number of families and persons residing (each) in two rooms only:—Two in family, 29 families, equal to 58 persons; three in family, 341 families, equal to 1,023 persons; four in family, 498 families, equal to 1,992 persons; five in family, 321 families, equal to 1,605 persons; six in family, 194 families, equal to 1,174 persons; seven in family, 85 families, equal to 595 persons; eight in family, 24 families, equal to 192 persons; nine in family, 2 families, equal to 18 persons; ten in family, 1 family, equal to 10 persons. Total, 1,495 families, equal to 6,667 persons.

Number of families residing in more than two rooms, equal to 2,149, which is about 55 per cent. of the total scheduled population; about 7 per cent. reside (each) in one room only, and 38 per cent. in two rooms only.

(5.) Islington.—Lower Division, including Barnsbury, Canonbury, Highbury, Kingsland, &c. The number of families and persons residing (each) in one room only is two in family, 491 families, equal to 982 persons; three in family, 1,097 families, equal to 3,291 persons; four in family, 666 families, equal to 2,664 persons; five in family, 412 families, equal to 2,060 persons; six in family, 179 families, equal to 1,074 persons; seven in family, 94 families, equal to 658 persons; eight in family, 18 families, equal to 144 persons; nine in family, seven families, equal to 63 persons; ten in family, one family, equal to ten persons. Total, 2,965 families, equal to 10,946 persons.

Number of families and persons residing (each) in two rooms only:—Two in family, 185 families, equal to 370 persons; three in family, 2,082 families, equal to 6,246 persons; four in family, 2,064 families, equal to 8,256 persons; five in family, 1,503 families, equal to 7,515 persons; six in family, 983 families, equal to 5,898 persons; seven in family, 691 families, equal to 4,837 persons; eight in family, 201 families, equal to 1,608 persons; nine in family, 66 families, equal to 594 persons; ten in family, 16 families, equal to 160 persons; eleven in family, 2 families, equal to 22 persons; twelve in family, 1 family, equal to 12 persons. Total, 7,794 families, equal to 35,518 persons.

The total number of families living (each) in more than two rooms in this district has not been ascertained with perfect accuracy; it is probably a little under 10,000.

(6.) In Islington.—Upper Division, including Upper and Lower Holloway.—The number of families and persons residing (each) in one room only:—Two in family, 131 families, equal to 262 persons; three in family, 261 families, equal to 783 persons; four in family, 186 families, equal to 744 persons; five in family, 161 families, equal to 805 persons; six in family, 71 families, equal to 426 persons; seven in family, 45 families, equal to 315 persons; eight in family, 10 families, equal to 80 persons; nine in family, two families, equal to 18 persons. Total, 867 families, equal to 3,433 persons.

Number of families and persons residing (each) in two rooms only:—Two in family, 105 families, equal to 210 persons; three in family, 553 families, equal to 1,659 persons; four in family, 729 families, equal to 2,916 persons; five in family, 645 families, equal to 3,225 persons; six in family, 458 families, equal to 2,748 persons; seven in family, 148 families, equal to 1,036 persons; eight in family, 82 families, equal to 656 persons; nine in family, 26 families, equal to 234 persons; ten in family, two families, equal to 20 persons; 11 in family, two families, equal to 22 persons. Total, 2,750 families, equal to 12,726 persons.

Number of families residing in more than two rooms, equal to 3,508, which is about 49 per cent. of the whole scheduled families; 12 per cent. reside (each) in one room only, and nearly 39 per cent. in two rooms.

The foregoing statistics summarised show that there were at the beginning of the present year, in the Finsbury division, 10,490 families, consisting of 41,044 persons, living (each) in one room only, and 17,210 families, consisting of 82,215 persons, living (each) in two rooms only.

In the City Division the number of families and persons residing (each) in one room only is two in family, 478 families, equal to 956 persons; three in family, 367 families, equal to 1,101 persons; four in family, 239 families, equal to 956 persons; five in family, 168 families, equal to 840 persons; six in family, 93 families, equal to 558 persons; seven in family, 45 families, equal to 315 persons; eight in family, 16 families, equal to 128 persons; nine in family, four families, equal to 36 persons. Total, 1,410 families, equal to 4,890 persons.

Number of families and persons residing (each) in two rooms only:—Two in family, 858 families, equal to 1,716 persons; three in family, 548 families, equal to 1,644 persons; four in family, 425 families, equal to 1,700 persons; five in family, 307 families, equal to 1,535 persons; six in family, 215 families, equal to 1,290 persons; seven in family, 144 families, equal to 1,008 persons; eight in family, 56 families, equal to 448 persons; nine in family, 13 families, equal to 117 persons; ten in family, 3 families, equal to 30 persons. Total, 2,569 families, equal to 9,488 persons.

SANITARY DOINGS OF THE MONTH.

By Our Roving Commissioner.

Adulteration.—Notwithstanding the existence of Acts of Parliament, framed with a view to prevent adulteration of our foods, and the small army of inspectors who keep as sharp a look out on suspected articles and dealers as their numbers and time will admit of this practice still flourishes to an alarming extent, and there are even large firms who defiantly place upon the market vast quantities of foods rendered attractive by means of showy labels which adorn

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the windows of, and are sold by the smaller class of shopkeepers. I have often heard it contended by some of the better class of condensed milk companies, that they believed that a large quantity of those brands retailed at a lower price than those which we are told is composed of pure milk, must be adulterated in some way; and it has been hinted that they are made from skim milk, that is to say, milk from which the cream has been removed, and consequently deprived of the greater portion of its nutritive quality. Making all allowance for interested motives in these assertions, I have, after calculating the quantity of milk each tin is supposed to represent before the process of condensation has taken place, and making allowance for the various expenses attendant upon the production of the article up to the time of its reaching the retail dealer, felt sure that the lower priced kinds could scarcely be composed of the pure milk; but no case had come to my knowledge of absolute proof as to the presence of adulteration. Recently, however, the Liverpool authorities have been actively engaged in bringing this fact to light; and no doubt now exists that the contention of the firms I have alluded to is correct, for the milk in question has been analysed and found to be composed of skimmed milk, and in the opinion of the analyst possessed less than half the value of ordinary condensed milk made from the genuine article. Several convictions have followed from the action of the inspectors; and it is stated that the company from whom it was sent forth are withdrawing it all, to have fresh labels put upon the tins. The misfortune as regards the convictions is that the real delinquent the manufacturer, escapes, the shopkeeper, who is his tool, being the one on whom the strong arm of the law falls. This matter should cause some thought to be bestowed on the whole question of condensed milk. That it has proved a boon to many thousands, particularly as an export article, there is not a doubt, and it has become a useful adjunct to the ordinary householder at home; but as between condensed milk in which sugar enters to the extent of between 30 and 40 per cent. and pure milk condensed without sugar at all, as an infant's or invalid's diet, a wide distinction is to be made. Ever since the feat was accomplished of condensing milk at all, some of the most intelligent chemists upon the Continent, seeing the disadvantage contained in the large percentage of sugar, have been endeavouring to overcome the difficulty, but it was not until about two years since that it was proved possible to reduce pure cows' milk by condensation, and to enable it to keep good when hermetically sealed for any length of time, without the aid of any foreign matter whatever. In the SANITARY RECORD for Sept. 15, 1883, an account was given by M. Vignal of the entire process carried out at the works of the First Swiss Exporting Company, Romanshorn, Switzerland, of this interesting process, and any one who read that report must have been convinced of the value of the pure milk produced by the company over that of the sugar-sweetened kinds. Yet it is notorious that this very fine milk, known as the 'First Swiss Brand,' is languishing in the market because it will not keep fresh so long a time when opened as its sugared prototype. Science has laboured hard for many years to accomplish what many supposed was impossible, yet when it has become a fact the public do not take it up. It is to be regretted that the profession do not take that interest in this new feature in condensed milk its merits demand, and recommend it to their patients in preference to sugared milk.

Ventilation, &c.—The return of spring and the open weather has caused considerable activity to be visible in sanitary work. A few days since an opportunity was afforded me of examining the arrangements carried out by Messrs. Banner Brothers for the ventilation of the Council's room at the Paddington Vestry Hall. This room, like many others in the metropolis where large numbers of persons constantly congregate, has for a long time been a source of great annoyance to its occupants, and the usual crop of headaches, &c, is said to have resulted from attendance on Board days. Recently certain firms were requested to tender for the ventilation of this apartment, and the contract was given to Messrs. Banner Brothers, who, I may state, were not the lowest in their tender, which may be taken by the firm as a compliment to their system and position. The room in which the work has been carried out is 26 feet wide, 46 feet long, and 27 feet high to that portion from which the roof or ceiling springs from the sides upwards in a bevelled line, and is some feet higher to the extreme top. On the one side the room faces Paddington Green, a large open space, and it is from here the inlet tubes have been laid, as offering the largest area and the freshest amount of air. The inlet tubes, twelve in number, 4 inches by 6 inches in size, are carried under the floor of the room and brought up behind a high wainscoting, so that no projections are visible, and anyone entering the apartment would not be aware that any system of ventilation was in use. The openings are all covered with a perforation to prevent the admission of smuts or dust; and they are placed in such positions as to prevent the admission of an undue preponderance of air in any part. Each of these inlets are furnished with the usual valve to regulate the admission, and when all are open they only reduce the initial atmosphere in a very small ratio, some of the inlets passing through a heating chamber at the back of the stove and becoming warmed before its admission. This simple arrangement speaks for itself. Should the weather be very cold, a large fire would doubtless be kept up, and that portion of the fresh air be correspondingly heated. If mild, the fire would be smaller, or there would not be any, and the incoming air would not require warming. The presence of the stove also obviates the necessity for introducing any other means for heating the air. To exhaust the vitiated air two ornamental roses from which th gas coronas depend have been divested of some of their ornament, making openings for its escape, and 18-inch tubes carried from thence to the roof, culminating in two Banner Ventilators of the same diameter. On the occasion of my visit, the atmosphere being comparatively still, measured by the anemometer, air was being admitted at the rate of about 100 feet per minute, and on ascending to the roof and measuring the exhaust through the 18-inch circumference tubes it was being withdrawn at the rate of between 90 and 100 feet per minute. The apparatus has now been in use about seven weeks, and it must be satisfactory to the firm to know that it has received the approval not only of the officials but of the members of the vestry generally. The plans were made and the work carried out under the supervision of Mr. Hubert, the engineer of the firm, and do great credit to his skill and ingenuity.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

AYLESBURY RURAL.—The report which Dr. Harvey Hilliard has presented to his authority in respect of the year 1883 affords an excellent example of the difficulties which beset sanitary improvement in a straggling and decaying rural sanitary district. It is not possible to get rid of excrement nuisances and well-pollution by any ambitious scheme of sewerage or water-works; and the only thing to be done is to perpetually remind the population of the danger and unwholesomeness of surroundings with which they have been contented for generations. This is uphill and rather heart-breaking work; but health-officers must be patient, and whilst never relaxing their vigilance, must not be surprised if their well-intentioned efforts do not meet with a sufficient response. Dr. Hilliard is able to chronicle a certain amount of 'greater attention to cleanliness and to the removal and avoidance of nuisances,' but, nevertheless, 'conditions injurious to health are everywhere prevalent in

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the arrangements for disposal of the sewage and the impurity of the drinking water.' Rarely is the latter found good or wholesome, and in many cases it is clearly contaminated by percolation from a closely-adjoining cesspool. Dr. Hilliard may well say that with 'the present system of closet and cesspool, with well for drinking water in more or less close proximity, sunk in most localities in porous limestone, it is a marvel that disease and death are not more frequently directly traceable to it.' Perhaps if the authority commenced a vigorous crusade for the repression of 'nuisances' generally, improvement might be perceptible in the state of affairs which Dr. Hilliard deplores. There are no very striking features in the mortality statistics. The death-rate was 17·1 per 1,000. Measles was epidemic in two villages, and diphtheria and croup were unduly prevalent.

CARNARVONSHIRE.—Although somewhat brief, Mr. Rees' reports on the various sanitary districts included in this combination leave little to be desired. His remarks on zymotic disease prevalence are always interesting, and his observations on sanitary requirements alike practical and to the point. Great strides have of late been made towards improving the sanitary condition of the combined area. In the Bangor and Beaumaris rural district important works of drainage and water supply have been completed, and similar works are being rapidly proceeded with at Menai Bridge. In the rural district of Carnarvon steps have been taken to improve the water supply, and considerable progress was made during 1882 in extending the old drainage and in the formation of new. At Conway great improvement has resulted from the cleansing of the reservoir of the water company, and at Bangor the recommendations of Dr. Barry, who visited the place to inquire into the circumstances of the disastrous epidemic of typhoid fever, seem to be receiving recognition. Criccieth is to be provided with by-laws, and at Ynyscynhavin steps were being taken for providing proper sewerage for that portion of the town near the docks, while in other portions of the combined area various schemes of improvement were in progress. The mortality statistics recorded during 1881 compared favourably with previous years. The death-rate in England and Wales was 18·9 per 1,000, and in the combination 18·4, the rates during 1882 being 19·6 and 18·6 respectively. Of the deaths from zymotic causes registered in 1881 nearly one-half (75) were caused by diphtheria and croup, the causation of which Mr. Rees discusses at some length; but during 1882 there was a noticeable decline in the mortality from these causes. The deplorable epidemic of typhoid at Bangor and Bethesda is naturally an important factor in the increased zymotic rate, which represented 2·01 against 1·26 per 1,000 for 1881.

HARTISMERE RURAL.—Dr. Barnes reports that although the death-rate of his district during 1882 was not so low as in the previous year, there was a decreased mortality amongst infants, and that sanitary work was actively carried on. Scarlatina of a mild form prevailed more or less throughout the district, and of some eighty-five cases two proved fatal. Impure water was found in association with several outbreaks of diarrhœa, enteric fever, and diphtheria. As regards this last disorder, of which there were no fewer than ten distinct outbreaks, Dr. Barnes thinks that unusual dampness of site was an important factor in its production. Small-pox was introduced into the district by a servant girl from London who was returning to her father's house, a small cottage containing eleven inmates. Immediately the existence of the disease became known a temporary hospital was erected, into which the whole family were removed, together with those who subsequently fell ill, who were all members of the same family, and had all visited the infected house. Special measures were taken for securing re-vaccination, and of the eight cases that occurred, none proved fatal. The incidence of the disease was, as usual, greatest amongst those who were the least protected by previous vaccination. The death-rate proper to the district was equal to 18·4 per 1,000 against 15·6 in the previous year. Dr. Barnes appears to have kept his district under constant supervision and he notes that while no great works have been undertaken, much has been done towards improving its general sanitary aspect.

HEBBURN.—Beyond stating that 206 houses had been kept under supervision on account of infectious disease, that some paving had nearly been completed, and that the lodging-houses were regularly inspected, this report is devoid of all information respecting the performance of sanitary work. Probably the extensive prevalence of scarlet fever may in some measure account for this grave deficiency, but it is one that should be remedied in future reports. The epidemic of scarlet fever commenced in February and spread rapidly over the district, and by the close of the year 144 houses had become infected. The disease seems to have been spread chiefly by direct contagion, which was assisted by what Mr. Sweet calls the 'alarming carelessness and ignorance of the inhabitants generally.' In some cases the health officer blames the condition of the sewers, which on examination were found to be blocked up. During the process of opening them the stench was such that the men employed had to use chloride of lime plentifully before they could go on with their work. Altogether 26 deaths were registered from this cause, being considerably more than half the whole number referred to the seven principal zymotic diseases. Diarrhœa came next in order of fatality with eight deaths, measles and diphtheria being each fatal in three cases. A temporary hospital for the isolation of infectious disease has been provided, but the district can hardly be served with safety by a structure of this kind. The death-rate was equal to 19·62 per 1,000 of population.

HELMSLEY RURAL.—Few events of importance occurred in this district during 1882, but Dr. Bruce Low has invested his report with more than local interest. He shows that in many respects the inhabitants are taking greater interest in their sanitary surroundings. Thus, in referring to the system of drainage and excrement disposal, Dr. Low observes: 'The greater care which the people are taking regarding ashpits, privies, and garbage heaps, has prevented much of the sickness which has prevailed in past years.' Again, in reviewing the work of the past ten years, he adds that 'it is encouraging to find that the doctrines of sanitary science are becoming better understood, and that the unconcealed opposition and even persecution which country sanitarians have experienced is gradually disappearing.' Such facts are, indeed, encouraging, and, in dwelling on their importance, Dr. Low tries hard, but we fear unsuccessfully, to infuse his authority with sanitary enthusiasm. The present report, like its predecessors, contains much of interest on the causation and spread of disease. The death-rate from all causes, 14·89 per 1,000, is the lowest on record, and but two deaths were recorded from the principal zymotic diseases. Only four deaths were recorded as due to the wasting diseases of infants, and Dr. Low is convinced that the reduction in the mortality from these causes is in part due to a better knowledge which the inhabitants now possess of how to feed their offspring.

KING'S NORTON RURAL.—The improvement which is gradually being made in the sanitary aspect of this district speaks well for the supervision exercised by the health officer, but, at the same time, it clearly shows the need that existed, and still exists, for prompt and vigorous action on the part of the authority. The district is still served by the privy and ashpit plan, a system upon which Mr. Hollinshead strongly animadverts. The middens are, he observes, more or less defective in construction, too large and deep, placed too near the house and wells, and are more dangerous when empty than full. Until a proper system of dry conservancy has been adopted, with regular and systematic collection, the health officer advises that they should be supplanted by water-closets in those portions of the district where sewers have been laid. The

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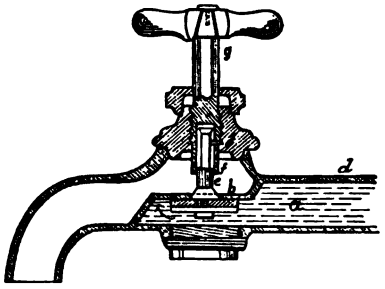
extension of the water mains seems highly desirable, since the water obtained from many of the wells was productive during 1882 of considerable sickness and death. No fewer than 12 cases of typhoid fever out of a total of 16 were attributed to impure drinking water, which was polluted by surface impurities after a heavy rainfall. The general death-rate, based upon a population of 19,683 persons, represented 13·21 per 1,000, the zymotic rate being equal to 1·52. Small-pox appeared in the district during the year, and two persons suffering from this disorder were removed to the Birmingham Hospital, where they died. There was no spread of the disease in Kings Norton, but Mr. Hollinshead reminds his authority of its prevalence in adjoining places, and urges them to be prepared in the event of another epidemic.

ILLUSTRATED SANITARY PATENTS.

285,574. PLUMBERS' TRAP: ROBERT CLARKE, Brooklyn, N.Y. Filed Jan. 6, 1883.

Claim.—1. The improvement in the art of manufacturing soft-metal traps, the same consisting in spinning the body of each trap into a cylinder with contracted open ends from a sheet of soft-metal, and then connecting the inlet and outlet pipes to the ends of the body so formed. 2. A former for use in spinning the bodies of soft-metal traps, made in detachable sections with reduced ends, and adapted to be combined with a separable support, whereby a trap-body with contracted ends may be formed and the sections and supports separated and the former withdrawn through the contracted ends of the trap, as specified.

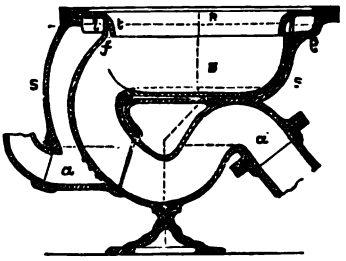
285,950. COMPRESSION-COCK: JAMES S. BARR, Wheeling, W. Va. Filed May 9, 1883.



Claim.—The valve *a*, arranged to close upward against the seat *b* by the pressure of the water, and having a stem, *e*, extending into the socket *f* of handle-stem *g*, said stem *e* being recessed, and stem *g* provided with a set-screw, *j*, connecting them together and limiting the fall of the valve.

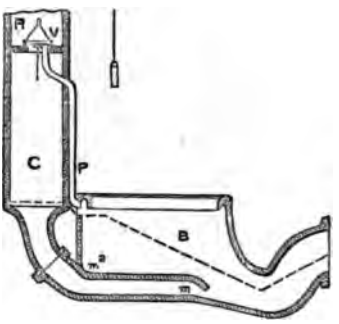
285,925. WATER-CLOSET AND SIMILAR RECEPTACLES: JOHN PICKERING PUTNAM, Boston, Mass. Filed Jan. 12, 1883.

Claim.—The combination, with the basin of a water-closet or similar receptacle provided with a trough or channel around its upper edge, of a flushing-rim and diaphragm, the said basin and said flushing-rim being cast separately, and the lower edge of the said flushing-rim extending within and below the upper edge of the said basin, while the said diaphragm divides the said trough into two passage-ways. 2. The combination with the basin B and shell S, provided with ledge *l*, containing groove *g*, of the flushing-rim R, provided with projection *t*. 3. The combination, with the basin of a water-c similar receptacle, of a flushing-rim, the said ba the said flushing-rim being formed in separate pie the said flushing-rim having its lower edge wit



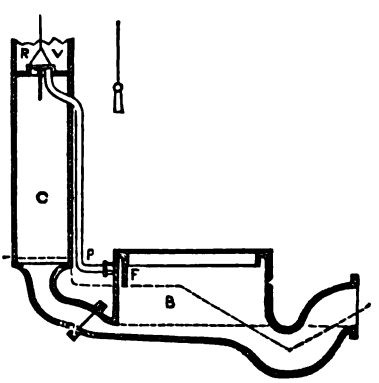
below the upper edge of said basin, and beve described. 4. The combination, with the casting vided with arms, *a* and *a'*, of the basin B and flush R, provided with projection *t*. 5. The combinatic the basin B, provided with a U-shaped passage introduce upper flushing-water, of the flushing-rim vided with flange *f*.

285,926. WATER-CLOSET: JOHN PICKERING NAM, Boston, Mass. Filed Feb. 3, 1883.



Claim.—1. The combination, with a trapped suitable for a water-closet or similar waste-recepti an air-tight water-chamber provided with two entering the trap of said basin, one above the oth both below the level of the seal. 2. The combi with the trapped basin B, of the air-tight water-cl C, having the two mouths m^1 and m^2, reservoir valve V. 3. The combination of the basin B, rese chamber C, having the two mouths m^1 and m^2, the and valve V.

285,928. WATER-CLOSET: JOHN PICKERING NAM, Boston, Mass. Filed June 2, 1882.



Claim.—1. The combination, with a trapped ba a water closet or similar receptacle, of an air-tight

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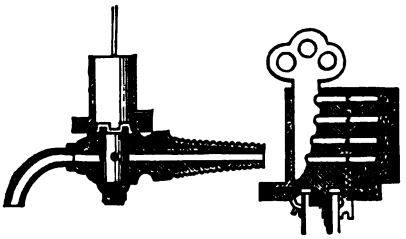
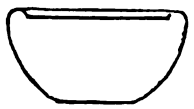
chamber communicating with the trap of said basin immediately below the normal water-level thereof. 2. The combination, with a trapped basin for a water-closet or similar receptacle, of an air-tight water-chamber communicating with the trap of said basin immediately below the normal water-level thereof, and provided with a valve through which the pressure of the air may be admitted to counterbalance the pressure of the atmosphere upon the water in the trap of said basin. 3. The combination, with the trapped basin B, of the air-tight chamber C, provided with the valve V. 4. The combination of the trapped basin B, air-tight chamber C, reservoir R, and valve V. 5. A trapped basin provided with an air-tight water-supply chamber normally closed, except at a mouth entering the trap below the level of its seal, and also provided with an independent supply-pipe entering the said basin near the upper line thereof. 6. The combination of the trapped basin B, reservoir R, air-tight chamber C, pipe P, and valve V. 7. The combination, with the bowl or basin of a water-closet or similar receptacle, of an adjustable fan or plate F, and threaded stem, *e*, screwing into a coupling, R, secured to the bowl or basin.

286,077. LOCK-FAUCET: JAMES SARGENT, Rochester, N. Y. Filed March 23, 1883.



286,000. MANUFACTURE OF GLASS BOWLS FOR WATER-CLOSETS: GEORGE E. HATCH, Meriden, assignor to the Hartford Sanitary Plumbing Company, Hartford, Conn. Filed June 19, 1883.



Claim.—As an article of manufacture, the herein-described water-closet bowl as blown from glass open—that is, without moulds or former—and having the flange turned over and inward in the process of manufacture.

THE Keble College Debating Society have been discussing vegetarianism, twenty-five voting for it and twenty against. Keble ought to be able to speak from experience, as one of their best torpid oars is a vegetarian.

AT the last meeting of the Paddington Vestry, Mr. Mark H. Judge, A.R.I.B.A., proposed the following resolution, which was carried by a large majority, viz., 'That it is highly desirable that public lavatory accommodation (with water-closets, &c.) for both men and women should be provided for the use of every part of the parish, and that a special committee of ten members be appointed to consider and report as to whether this accommodation cannot be provided in such a way as to be a boon to the immediate vicinity in which it is placed, instead of being a nuisance, as must be the case, more or less, where structures for this purpose are erected in the centre of the public thoroughfare.' A Committee was at once appointed to carry out the resolution.

THE Salford Corporation have accepted the tenders of Messrs. Robert Neill & Son for the erection of baths in Pendleton, in accordance with the specification, for the sum of 5,414*l.*, and Messrs. Thomas Bradford & Co., for the engineering works in connection with the same baths, for the sum of 1,046*l.* 10*s.*

LAW REPORTS.

(*Before* Mr. BARON POLLOCK *and* Mr. JUSTICE LOPES.)

The Queen (*on the prosecution of the Local Government Board*) v. *The Cheshunt Local Board.*

A DILATORY LOCAL BOARD.

THIS case raised in a very serious and striking form one of the great questions of the age, How to dispose of the sewage of towns or populous places. It appeared in one of the affidavits in the case, the affidavit of one of the assistant secretaries of the Local Government Board, that as long ago as May 1874, that is, nearly ten years ago, the attention of the Board was called to the subject of the drainage of Waltham New Cross, under the jurisdiction of the Cheshunt Local Board, by a letter from Colonel C. Younghusband, the superintendent of the Royal Gunpowder Factory, Waltham, stating that 'the majority of the inhabitants of the district are Government workmen employed either in the Small Arms Factory, Enfield, or in the Royal Gunpowder Factory, Waltham Abbey, and that several fatal cases of typhoid fever had occurred, and that the medical officer of the Cheshunt Local Board had described the place as the most pestilential place he was ever in in all his life,' and that in the previous March the acting surgeon to the Gunpowder Factory had made a representation to the Local Board on the subject, which, however, had elicited no reply, and the colonel complained of the 'determined neglect' of the Cheshunt Board in applying remedial measures. The letter of the surgeon enclosed stated, 'I believe in the locality there are at least 200 houses densely populated; and that there was not a single public sewer or drain, nothing but cesspools, with shallow wells in close proximity to them, in consequence of which there was no water fit to drink or use;' and he was fearful that if that state of things was allowed to continue there would be a severe outbreak of fever sooner or later, and many lives lost, and he stated that already in six weeks he had had nine cases of typhoid fever in the locality. The Local Government Board had at once drawn the attention of the Cheshunt Board to the subject, enclosed an abstract of Dr. Garlike's report on the sanitary state of the district, in which he stated that 'he never was in a place so pestilential in all his life.' 'In one garden three large cesspools—the sewage matter oozing out—the water most offensive, the inhabitants go to a sort of ditch to get their drinking water, and when they boil it a beastly scum covers the surface. There is not a drop of water in the place, he believed, fit for cooking. There is no drainage at all in the place, but a beastly lot of stagnant ditches, covered with slime and scum, &c.' The Local Board at Cheshunt replied that the subject was engaging their attention. In 1875 the Local Government Board ordered an inquiry by Dr. Thorne, who made a report in which he stated—'Speaking generally of the district, its sanitary circumstances were thoroughly bad. The arrangements for sewerage and drainage were most incomplete, or there is an utter absence of them,' &c. The Cheshunt Board entered into negotiations for the acquisition of land for the disposal of the sewage, but they did not satisfy the Local Government by their arrangements; and in May 1880 the Local Government Board communicated another report they had received, and said—'It is with much regret they learn that the Local Board are unwilling to take action with reference to the sewerage of their district, at all events for the present.' In September 1882 the Local Government Board made an order 'that the Cheshunt Board shall perform their duty in the matter of the complaint, and shall commence forthwith to execute the works necessary for that purpose, and complete the same in nine months.' Correspondence took place, and applications for delay; and in August last, in consequence of repeated petitions and memorials to the Local Government Board, they wrote a letter to the Cheshunt

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Board recapitulating the proceedings which had taken place, and calling upon them without further delay to take the necessary steps. Nothing being done, however, the Local Government Board on November 5 last gave the Cheshunt Board notice of their intention to apply to the Court for a mandamus. The application was accordingly made, and a rule nisi granted; and now, upon affidavits setting forth the history of the case in substance as above stated, and also stating that the Cheshunt Board had declared that they did not mean to do anything until the mandamus was granted, and that they did not mean to oppose the mandamus,

The Solicitor-General moved on the part of the Local Government Board that the rule for a mandamus might be made absolute, and the Court made the order absolute accordingly.

Repeated Vaccination Prosecutions.

In re the Justices at Eastbourne—in the Matter of an Order under the Vaccination Act.

This case, tried before Mr. Baron Pollock and Mr. Justice Hawkins as a Divisional Court of the Queen's Bench Division, in February 1884, was important as upholding the principle which has more than once been decided by the courts, that offence against sect. 31 of the Vaccination Act of 1867 can only be purged by the vaccination of the child, and that repeated prosecutions may therefore be instituted until the offence is so purged. Sect. 31 gives power to a justice on the application of the vaccination officer to make an order for the vaccination of a child under 14 years of age. In the original draft of the Act of 1867 there was an express provision 'that it shall be no answer to the making of such an order that the person on whom it shall be proposed to make it shall have been previously convicted of an offence under the Vaccination Act;' but this was struck out in committee, and the Act was passed without it. Nevertheless, in 1870, in a case which raised the question, 'Allen *v.* Worthy,' it was held that a parent having been fined under the Act for disobeying an order to have his child vaccinated might be proceeded against from time to time as long as the child remained unvaccinated, which was held by the late Lord Chief Justice Cockburn, Mr. Justice Mellor, and Mr. Justice Hannen. The Lord Chief Justice then observed:—'I think that the power given by sect. 31 is not confined to one notice, one order, and one conviction, but that the whole proceeding may be instituted *toties quoties*, so long as the disobedience continued.' And though next year another Vaccination Act was passed, there was no enactment introduced to alter or correct the law thus laid down.

In the present case the same question had arisen. In September 1881 the applicant had had an order made against him to have two of his children vaccinated, and for breach of that order he had been summoned and fined, and the fine and costs had been duly paid. In August last he had been again summoned for not having had the same children vaccinated, and an order was made which he had again disregarded, and then on a summons in January for disobedience to that order he set up as a defence the former conviction, but the magistrates had not considered it any answer and had inflicted fines. The applicant now desired to bring the conviction before the Court to set it aside on the same ground, that he could not be twice punished for the same offence.

Mr. Baron Pollock said they felt that to grant the rule would be doing something which might tend to unsettle the law. The construction of the Act had been settled fourteen years ago in a case decided by three very learned judges, and it had never been questioned since. And, on the other hand, a new Act had been passed soon afterwards in which no new enactment had been introduced to alter the law as thus declared. Mr. Justice Hawkins concurred, observing that if the law as thus laid down had been disapproved of it would have been easy to introduce some words in the new Act (of 1871) to do away with it; and in the absence of any such enactment it must be taken that the law was settled, and it would not be right to do anything which might tend to disturb it. Rule refused.

WESTERN CIRCUIT.

Alleged Breach of the Public Health Act, 1875, Sect. 193.

Burgess v. *Clark and Collins.*

At Devizes, the case of Burgess *v.* Clark and Collins has been heard before Mr. Justice Cave and a special jury. It was an action by a common informer to recover penalties for an alleged breach of the Public Health Act, 1875. The defendants are solicitors at Trowbridge. In 1873 they entered into an agreement with the Local Board there, letting to them certain rooms as offices. They were not then employed by the Local Board, but in 1877, during the continuance of the agreement, they were appointed clerks to the Local Board, and still occupy that position. In 1880 a new agreement was substituted for the above, other rooms being let, one of them being for use as an office for the surveyor of the Local Board. It was contended on behalf of the plaintiff that these agreements constituted breaches by the defendants of section 193 of the Public Health Act, 1875, which enacts that—'Officers or servants appointed or employed under this Act by the local authority, shall not in any wise be concerned or interested in any bargain or contract made with such authority for any of the purposes of the Act. If any such officer or servant is so concerned or interested, or under colour of his office or employment exacts or accepts any fee or reward whatsoever, other than his proper salary, wages, and allowances, he shall be incapable of afterwards holding or continuing in any office or employment under this Act, and shall forfeit and pay the sum of 50*l.*, which may be recovered by any person, with full costs of suit, by action of debt.' The contention on the part of the plaintiff was that the agreement was a 'contract within the meaning of the first part of the section.' For the defendants it was contended that the rent paid under it was merely one of the 'allowances' under the second part of the section, which the Local Board had power to make to their clerks. It was also urged that this action was brought more than twelve months after the alleged offence, and consequently was too late. No fact being in dispute, by consent the jury were discharged, and his lordship gave judgment for the plaintiff for 50*l.* and costs, and stayed execution for a month, and if appeal put down within a month, execution stayed until the appeal should be disposed of.

Butter and Milk Adulteration.

Edward Bennett, grocer and cheesemonger, of 109 Kentish Town Road, was summoned at the instance of the Vestry of St. Pancras for selling 'butter' adulterated with 80 per cent. of foreign fat. There was a further summons against him for selling milk diluted with 15 per cent. of added water. Mr. De Rutzen imposed a penalty of 5*l.* in each case, with costs.

Bennett Opie, cheesemonger, of 105 Fortess Road, was summoned for selling 'butter' adulterated with foreign fat to the extent of 60 per cent. A fine of 5*l.*, with costs, was imposed.

Thomas Draper, dairyman, of 129 Fortess Road, appeared in answer to two summonses charging him with selling 'butter' containing 65 per cent. of foreign fat, and milk diluted to the extent of 30 per cent. of added water. A fine of 5*l.*, with costs, was inflicted in each case.

Thomas Prenck, dairyman, of 153 Highgate Road, was fined 5*l.* and costs for selling milk deficient in butter-fat to the extent of 50 per cent.

At Stratford petty sessions, William Marsh, a dairyman, of 2 Thornhill Road, Leyton, was summoned by Captain Kittoe, an inspector under the Food and Drugs Act, for selling milk not of the nature, substance, and quality of the article demanded. Captain Kittoe deposed to purchasing a pint and a half of milk, a third of which being

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sent to the public analyst was found to be adulterated to the extent of 28 per cent. of added water. Defendant pleaded that he sold the milk just as he received it, and added that he could not sell good milk if he did not get it. Captain Kittoe said that on November 14 last defendant was fined 20*s.* for a similar offence. The Bench said the only mitigation they could grant would be to reduce the full fine of 20*l.* to one of 5*l.* and costs.

Thomas Child, a dairyman, of Church Road, Leyton, was summoned for a similar offence (the adulteration being 20 per cent. added water), and as it was the first offence was only fined 20*s.* and the costs.

William Munster, of Woodhouse Road, Leytonstone, was also summoned for adulterating milk. Mr. Benson, an inspector under the Act, deposed to purchasing a pint and a half of milk on January 25 last; and, forwarding a third part to the public analyst, it was certified to be adulterated to the extent of 10 per cent. Defendant, who pleaded that he sold the milk exactly as he purchased it, was fined 20*s.* and the costs.

At Manchester, Peter Snelson, of Mouldsworth, near Chester, was fined 20*l.* and costs for selling milk adulterated with 18 per cent. of water. He had previously been fined 10*l.* and costs for a similar offence.

At Brentford Petty Sessions William F. Goatley, Hounslow, was charged with selling as butter an article containing no butter whatever. The purchaser, in the employ of the food inspector, asked for butter, and the compound sold consisted exclusively of foreign fats (not butter), water, and salt. Mr. Glossop, chairman of the Bench, pointed out that the article was purchaseable at 6½*d.*, and could be sold with profit at 7*d.* or 8*d.*, whereas it was actually vended at 1*s.* 2*d.* per lb. Defendant was fined 10*l.* John Jones, grocer, Hounslow, was also fined 10*l.* for a like offence.

Drainage Case.

An interesting and important case has been heard in the Dumbarton Small Debt Court, in which Patrick Smith Dunn, shipowner, Glasgow, sued Jas. King Walker, house agent, for 19*l.* 5*s.*, restricted to 12*l.*, in name of loss and damage sustained by the plaintiff as tenant of a dwelling-house called Thistle Bank, Lenzie, belonging to defendant, in consequence of a bad state of drainage and of the sanitary arrangements of said house, whereby the health of the inmates suffered, who in consequence were compelled, in June or July 1883, to leave that house for some time when the drains were being repaired. For all this the plaintiff held that the defendant was liable, in respect that the same was caused through his fault and negligence, his attention having been repeatedly called thereto. The items in the account due by defendant to plaintiff are:—Dr. Smith's account, paid by plaintiff, eight visits at 5*s.*, 2*l.*; account of W. P. Buchan, sanitary engineer, for report on drainage, paid by plaintiff, 1*l.* 5*s.*; rent of a house at the coast for one month, during which time the house at Lenzie was untenable while defendant's tradesmen were executing the necessary repairs.

Defendant denied all liability.

From the evidence it appeared that at Whit-Sunday 1880 the plaintiff became tenant of Thistle Bank, Lenzie. Shortly after he took occupancy the plaintiff found it necessary to write on four separate occasions to Mr. Walker, complaining about offensive smells in the bath-room and the lobby. In June 1883 plaintiff had occasion to go from home, and on his return found three of his children very seriously ill, and his medical attendant (Dr. Smith) insisted that the illness was caused by bad drainage. Information was at once sent to the defendant, who replied verbally to the plaintiff that he could do anything he liked, as the defendant did not intend to take any action in the matter. Mr. W. Paton Buchan, sanitary engineer, was engaged to inspect the pipes at the house, and, notwithstanding that intimation of the inspection had been given to Mr. Walker, he did not send a representative. Mr. Buchan reported that he considered that the drains or pipes in connection with the house were leaking inside of the house in a way detrimental to the health of the inmates. After the report had been sent to the defendant, Mr. Turnbull, architect, visited the house, and ordered a complete alteration of the drains. The plaintiff went to the sea-coast for a month, until the repairs could be executed, on the advice of Dr. Smith, who considered that it was dangerous for the family to remain in the house. The doctor did not think that it was caused by the sewage gas prevalent in Kirkintilloch. He admitted that the diphtheritic throats might have been got infectiously. The tradesmen who executed the work stated that they had cleaned the cesspool, and put in an air-trap, and altered the drains so that the drains would not pass through the house. These alterations were carried out on the recommendation of Mr. Turnbull.

The Sheriff, in giving judgment, said that there was no doubt in his mind that the children had suffered from bad drainage, and he awarded that item in the account refering to Dr. Smith's. Exact notice should have been given of the hour at which Mr. Buchan was going to make inspection of the drains. He disallowed that part of the account. The evidence given was to the effect that the repairs could have been executed in three days; and, although the plaintiff was not entitled to a house at the coast for a month, he gave 2*l.* for temporary premises. Decree for 4*l.*, with 30*s.* expenses.

Bad Meat Cases.

At Hanley, George Cooper, a butcher, has been sent to two months' hard labour, without the option of a fine, for exposing bad meat for sale in Hanley Market. The evidence showed that the prisoner purchased the carcase of a cow, which had been accidentally strangled, for 4*l.*, and offered the meat for sale at the usual price. The authorities seized 230 lbs. from his stall, some of it being in an advanced stage of decomposition.

Defective Drainage and Scotch Law.

Evidence was adduced before Sheriff Murray in a small-debt action of considerable importance to proprietors, and which arose from a defective drain. The plaintiff, Mr. Wm. Robertson, Hillhead, sued Mr. John Neilson, builder, Glasgow, for 12*l.* From the complaint it appears that defendant was, in Sept. 1877, employed to alter the drains in plaintiff's house. The summons bore that 'the work was done in a defective, insufficient, and untradesmanlike manner, in consequence of which obnoxious gases were emitted to the danger of life and health.' Plaintiff estimated that he had suffered loss to the extent of 30*l.*, including outlays of 17*l.* 8*s.* incurred in remedying these defects. It was not till May 1883—the work being below ground—that the defects were discovered. The damage was restricted to 12*l.* Mr. Robertson having spoken to the contract and to being annoyed with smells for some time in the house, Mr. Gilbert Thomson, engineer for the Glasgow Sanitary Protection Society, was examined as a witness. He stated that in May 1883 he was asked to make an examination of the drains in Mr. Robertson's house, and his opinion was that the pipes had not been properly cemented. Mr. Miller, of Messrs. W. & P. Miller, said he examined the drains in Mr. Robertson's house. He found that they had been badly laid and badly jointed. For the defence a witness stated that he had assisted to lay the pipes, and that the work had been done in a tradesmanlike manner. He had had twenty years' experience in laying drains. The drains were properly cemented and fixed up. Mr. Neilson, the defendant, said he got special instructions to carry the pipes through the house. He did not allow any broken pipes to be used, and the work was executed in a substantial manner. The details connected with the jointing were all properly attended to. From 1877 till 1883 he had had heard no complaint, and the pipes had been taken out without his having seen them. The Sheriff held that circumstances which came to light in the course of the

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evidence proved that there were original defects in the laying of the pipes, and as the present action was simply for compensation for putting right what was originally defective, he found the plaintiff entitled to the sum claimed —viz. 12*l.*

BRIEF NOTES OF USEFUL CASES.

HIGHWAY.

1883. *Amesbury Guardians* v. *Wilts JJ.* 'Highway Act, 1878,' § 13—Expenses of removal of snow from main road held expenses the half of which could be recovered from County Authority. (52 L.J., M.C., 64; L.R., 10 Q.B.D., 480.)

HOSPITAL COMMITTEE.

1883. *Benthall* v. *E. of Kilmorey.* Action by Resident Medical Officer to restrain Hospital Committee from dismissing him. There being a Trust Deed and plaintiff having proceeded without the sanction of the Charity Commissioners (see 16 & 17 Vict., c. 137, § 17) held that he was without remedy. (L.R., 25 Ch.D., 39; 49 L.T., 127.)

POWERS OF HIGHWAY BOARD.

1883. *Billericay H.B., In re.* Although a Highway Board becomes dissolved *pendente lite*, it is nevertheless entitled to recover the unpaid costs of an Appeal. (52 L.J., M.C., 124.)

SEWERS.

1883. *Bird* v. *Brentford Union.* Application for Injunction to restrain entry on land to lay a sewer under the 'Public Health Act, 1875,' § 16, no proper statutory notice having been given previously. On it being shown that a notice had been given five days after the entry and that no real inconvenience had been caused, Injunction refused. (*Times*, July 2, 1883.)

SCAVENGING.

1883. *Corrie* v. *Reddin.* Action by Freeholder for damage done to his estate by a Leaseholder excavating soil and filling up the holes with scavengers' refuse—Damages awarded, 2,000*l.*, and Injunction to remove the refuse and restore good soil. (*Times*, June 26, 1883.)

COMMON.

1883. *George* v. *Lysaght.* Common of Pasture—Local Act securing rights of recreation—Turf diminished by acts of adjoining owners—Action for damages held not maintainable. (49 L.T., 49; 47 J.P., 696.)

MARKET RATING.

1883. *London, Mayor,* v. *Greenwich Assessment Committee.* Lairage dues held rateable as being connected with the soil. (48 L.T., 437; 47 J.P., 420.)

RATING OF UNLET LAND.

1883. *Pembroke* v. *W. Overseers.* Grass land not being occupied by a tenant, Rate demanded from owner—Held that overseers could not, under the circumstances, render owner liable by inserting his name in Rate-book after the Rate had been allowed without his name appearing. (47 J.P., 359.)

COMMONS.

1883. *Reg.* v. *Pritchard.* Hampstead Heath By-Laws—Summons for breach thereof dismissed by Justices on defendant setting up and establishing a claim of right to play cricket at *locus in quo*—Held that the Justices were justified in ignoring a By-law under an Act which, though it authorised By-laws being framed, yet saved all existing rights. (*Times*, Dec. 12, 1883.)

AUDIT.

1883. *Reg.* v. *White.* Overseers held not entitled to oppose a Bill in Parliament at the cost of the Rates, although the Bill, if passed, would have put special charges on the Poor Rate of the parish. (52 L.J., M.C., 128; L.R., 11 Q.B.D., 309; 49 L.T., 183; 47 J.P., 741.)

STOPPING UP OF HIGHWAY.

1883. *Reg.* v. *Yeadon.* Proposed stopping up of a highway—A notice of objection stating that the proposal would be an 'inconvenience' held sufficiently explicit, and that the appeal might be heard on such notice. (47 J.P., 260.)

SEWER.

1883. *Sandgate I..B.* v. *Lenney.* Sewer carried through private land—Covenant in deed granting Board access to sewer held not broken by defendant merely by building over a portion of the ground, seeing that reasonably convenient access to sewer could still be had at all times. (*Times*, Aug. 2, 1883.)

RATE.

1883. *Watson, Kipling, & Co., In re.* Occupation by a liquidator held under the circumstances not beneficial, and Rates not recoverable in full. (52 L.J., Ch., 473; L.R., 23 Ch.D., 500; 49 L.T., 115.)

REVIEWS.

Hops and Hop-Pickers. By the Rev. J. Y. STRATTON. London: Society for Promoting Christian Knowledge, Northumberland Avenue, W.C. Pp. 191.

THE author of this useful little book is the rector of a Kentish village which is annually exposed to the irruptions of hop-pickers from the metropolis. The scenes of vice, misery, and degradation which the presence of these unwelcome visitors entails have deeply impressed Mr. Stratton with the necessity of some systematic efforts being made to improve the moral and social condition of the hoppers. He gives in his book an interesting account of the various steps which have been taken by philanthropic societies and by the growers themselves with this object; but he arrives at the not difficult conclusion that a very great deal still remains to be done. No one who knows anything of the habits of the very poor can affect to be surprised at the description which Mr. Stratton gives of their encampments in hop-gardens. Considering the scandalous indifference which growers often manifest to the housing of their pickers, the moral and physical contamination which results from the overcrowding cannot be wondered at. With many of Mr. Stratton's suggestions we have no immediate interest, though most of them appear wise and useful. Our chief concern is necessarily with the sanitary aspects of the hop-picking.

It may probably be admitted that bad and improper as the accommodation is, it is no worse than that of the 'homes' in the slums of London which the people have left behind them. But two blacks do not make one white. The evil of overcrowding, with all its attendant mischiefs, is one to be attacked in season and out of season; and Mr. Stratton's pages make it clear that at least reasonable decency can be secured without appreciable cost to the grower.

The author feels keenly the failure of permissive legislation with regard to the making of by-laws concerning hop-pickers. On one ground and another a great many local authorities have neglected to make the by-laws first authorised by the Sanitary Law Amendment Act of 1874, and there are at present no powers to compel them to make, and, what is the important thing, to enforce such by-laws. He gives a dismal picture of the prevarications of some of the authorities, and he regards as the only effectual remedy the compulsory making by all local authorities 'of districts visited by persons employed in the picking of hops, of fruit, and of planting or picking vegetables,' of by-laws for securing the decent lodging and accommodation of such persons.

The agitation for the substitution of compulsion for permission in clauses of Acts of Parliament is a pretty steady one, and perhaps in some cases is well founded. But its advocates appear to forget that compulsory legislation may be as much of a dead letter as permissive

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legislation unless there is in the background a specially wakeful central authority to hold the rod over recalcitrant local boards. Our system of local government all tends to decentralisation, and the Local Government Board would certainly require a powerful tonic before they could be brought to override the expressed wishes and intentions of local authorities. We would counsel Mr. Stratton, therefore, not to rely too much upon the nominal stringency of the law, but rather upon the gradual influence of those philanthropic and moral agencies in which he has played so conspicuous and beneficent a part.

The Distribution of the Poor in London. By Hugh MacCallam. London: E. W. Allen. Pp. 11. This pamphlet is the work of an amiable philanthropist rather than of a practical reformer. The driving out of the poor from the midst of the dwellings of the rich has certainly not been an unmixed blessing; but we fear that reverting to the times when 'the poor dwellers in the heart of London could reach the West End by an easy walk' would not help forward the question much.

NEW INVENTIONS.

THE NEW FOOD-WARMER AND NIGHT-LIGHT OF THE SILBER LIGHT COMPANY.

THIS useful addition to nursery or sick-room appliances differs in one essential point from others intended for the same purpose, the arrangement of the light or heat generator rendering it available at all times as a hand-lamp, as the appended illustration shows. A polished wooden base supports two ornamental standards, on the

top of which is fixed a strong tin cylinder with a hole in the under part and a range of smaller ones around the circumference of the upper part. Into this is placed another tin vessel to hold water, the heat from the lamp passing between the two vessels, and out of the smaller holes. Into the water holder is inserted the glazed earthenware food-warmer. The lamp, an ordinary glass night-lamp with chimney, and handle to enable it to be carried about, has a flat wick and burns petroleum or other mineral oil. The heat which can be obtained from this lamp is capable of raising any liquid to boiling point if required. The cost of burning is about one-fourth that of night-lights, and it gives more than four times the amount of light, indeed quite sufficient at all times for a nursery, thus fulfilling a double function, and so saving expense. Should the light be required for any other purpose, it can be removed without disturbing any other portion and replaced when done with, an arrangement that will often be found very useful. In cases of bronchial or pulmonary affections, by removing the food-warmer and having a lid with a small tube made to the tin vessel, filling this with water and adding a few drops of sanitas oil or other medicated preparation, a vaporiser is improvised suitable to the case, and the atmosphere of the room moistened with beneficial effect to the patient. This night-lamp can be seen in action and obtained at the company's depôt in Whitecross Street.

BUILDING MATERIALS FOR ARTISANS' DWELLINGS.

AT a time when so much interest is aroused by the question of housing the poor, and when it is probable that a large number of buildings must shortly be commenced to meet its just demands and to replace the dilapidated houses that will be taken down, not only in London but in other cities, it may be useful to indicate some new and good varieties of constructive materials. Although in some few places stone is largely used in house building, brick is, and it may fairly be assumed, always will be, by far the most important material for this purpose, and also the best, if well made and of good material. Cottages and mansions are alike mainly constructed of it, though of different qualities, and many know too well the injurious effects that arise from the use of the inferior kinds annually incorporated into the cheaper class of dwellings. It is as essential that the artisan's house should be constructed of as sound material as that of his more wealthy neighbour, but excessive competition, and that inordinate desire to cheapen everything, which is a feature of our time, has become a serious evil, and one that should certainly be arrested in house building. Sanitary bricks of a very superior quality, and of almost inexhaustible supply, can now be obtained at a price that should satisfy the most mercenary advocate of cheapness, and can therefore be used for the commonest class of house, while they are equally suitable to the mansion, being made, though of the same clay, of superior finish for high-class work. It is to Devonshire that we are indebted for this new accession to our resources in building materials. The traveller who takes train at Newton Abbot cannot fail to notice as he passes Heathfield station, two tall chimney stacks built of a beautiful light-coloured brick, and other buildings denoting that an industry of some magnitude is being carried on; these are part of the works of Messrs. Candy & Co., Limited. The clays here deposited are rich in silica (Candy & Co.'s showing by analysis to contain as high as 87 per cent.) whereby twisting and warping is avoided, and the material can be safely fired until it becomes a non-absorbent and semi-vitreous body. From this exceedingly fine body C. & Co. manufacture their non-absorbent and semi-vitreous terra-cotta, of flint-like hardness, not liable to vegetate, or get dingy and sooty, like Bath or Portland stone, but will retain its freshness and purity of colour, because, not having a porous surface like stone, it does not hold soot and other impurities, is fire-proof as well as frost-proof, and may truly be said to be imperishable. There is no doubt that the property acquired by this firm contains in all probability the finest specimens of those materials throughout the British Isles. At the works, known by the name

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of the Great Western Potteries, the clays are worked from the open, as pits, and not from mines; hence the raising of the crude material is accomplished with greater ease, less expense, and without injury or danger to life or limb of the workers. Mr. W. Pengelly, F.R.S., &c., has paid considerable attention to the Devonshire clays, and in a paper read before the Devonshire Association for the Advancement of Science, Literature, and Art, last year, gave some very interesting facts in connection with this formation, a portion of which he considers to belong to the Lower Miocene period, and another to the Glacial. Some idea may be formed of the value of this material when it is stated that large quantities of it in its crude state are constantly being exported for the manufacture of chemical vessels, on account of its capability of withstanding the most powerful acids, and as much or more is annually sent to the Staffordshire potteries, where it is mixed with the china clay and used in the manufacture of china and other ware. It is scarcely conceivable that a clay of such valuable attributes should be used for making common bricks, yet such is the inexhaustible nature of the supply, both here and at the other works of Messrs. Candy & Co. at Marland, near Torrington, on the northern side of Dartmoor, that not only can the first-named demands be met, but cheap wire-cut, and higher classes of bricks, sanitary ware of all kinds, and terra-cotta work generally, can be turned out in enormous quantities, and it has been calculated that at the Great Western Potteries alone, even with a largely increased demand, sufficient clay of this fine quality exists to last the firm for at least 150 years. The terra-cotta bricks can be sold at a price but little in excess of the common building brick used in London; but, if we take into consideration their imperishable features, they are considerably cheaper, independent of their sanitary character. Of a somewhat creamy colour, they are technically named a warm-tinted buff, and have a most pleasing appearance. From the composition of the clay they are damp-proof, and distinguished as 'granite vitrified,' this latter feature being obtained without the admixture of any foreign substance, such as metallic oxides, largely used in the making of so-called vitreous bricks, which are, however, only 'vitrified' to a certain distance from the surface, while in the Candy brick this feature runs entirely through, and so intensely hard do they become in firing, that glass may actually be cut by their sharp edges. It will hence be readily understood that their power of resisting enormous pressure is very great, as proved by Kirkaldy's tests, and for this feature they have been recently used by the Government for the construction of docks. If it be borne in mind that an ordinary building brick absorbs about one pound of water, and that consequently 100,000 will hold in suspension over 40 tons of water, the value of this brick, from a sanitary point, is still more apparent. But when the moulded and fancy qualities, which are only the same brick of superior finish, are in question, their economical features are the more apparent, and it is perhaps on these classes that the firm more particularly pride themselves. The same remarks apply to their terra-cotta productions. In addition to the fine light-coloured clay already mentioned, the Great Western Estate contains a red clay of similar quality, as yet almost unworked. This, when fired, produces that tint of red brick, known as the 'Queen Anne' red, and it is equally valuable as a sanitary clay. There is still another element in this deposit in the form of a valuable fire clay, which is of so pure a quality that large orders are constantly being received for it, and the Government, having satisfied themselves of its worth, are patronising it for the forges and melting furnaces at the various dockyards in preference to what they have hitherto used. One machine in constant use turns out 4,000 bricks per hour.

The foregoing details will be useful to architects and builders seeking for constructive materials which shall be at the same time of a beautiful appearauce, sound, and durable.

JAFFREY'S PATENT GRATE.

In the SANITARY RECORD for Oct. 15, 1883, a detailed description with illustrations was given of a comparatively new fuel-economising and smoke-consuming grate, manufactured at Manchester. The apparatus is the invention of a Mr. Jaffrey, of that city, and was exhibited at the Smoke Abatement Exhibition held there in the spring of 1882, where it was awarded a silver medal, the highest bestowed on anything exhibited—its performances, according to the official tests, having been of a very satisfactory character. Notwithstanding these results, the persons into whose hands this grate passed considered that improvements could be introduced into it that would increase its efficiency as a fuel economiser and smoke consumer The description published in the SANITARY RECORD pointed out these alterations, and since that date a company has been formed under the title at head, and premises have been taken at No. 6 Charing Cross, where the grate can be seen in operation daily, and where, from others unfixed, the entire principle on which its arrangements are based is shown and explained to visitors. One of the advantages claimed for it by the makers is its ready adaptability to most existing grate fronts, while in matter of embellishment it is capable of ornamentation to almost any extent.

THE THOMPSON SMOKE-CONSUMING GRATE.

One of the most promising features in connection with the movement for the abatement of smoke has been the introduction of appliances for that purpose by persons entirely unconnected with the manufacture of grates or heating apparatus. The Smoke Abatement Exhibition introduced many instances of this character, and since its close publicity to other inventions has been given in our columns having a similar origin. The one now under notice is a case in point. The inventor, Mr. H. Thompson, of Marquis Road, Canonbury, had had his attention called to the subject prior to the exhibition, when he exhibited a grate based upon smoke-consuming principles. Since that time he has laboured in the same field of usefulness, the outcome of which is the grate in question. At no distant date we shall be enabled to present illustrations of it in its present form and with other modifications in contemplation by the inventor. Divested of all technical bearings, the difference between this and ordinary open grates is that, in place of putting the coal on the top or front of the fire, it is placed in a small chamber at the back, where it becomes heated and coked and falls to the bottom, and by an automatic mechanical motion is sent into the body of the fire-basket. The fire by this means is always clear and bright, throws out great heat, and practically consumes the smoke. An important point in the invention is that grates made on this principle can be produced at but small cost in excess of the cheapest class of register grates, a point of great economic importance, which should be borne in mind by all who seek to improve our existing arrangements.

CORRESPONDENCE.

[All communications must bear the signature of the writer, not necessarily for publication.]

VENTILATION.

I have read Mr. Thompson's remarks on p. 421, and if his system could really do all that he claims for it, and were truly an inexpensive system, it ought to be widely adopted; but the worst of it is that a number of persons who have particularly recommended their systems and appliances as being infallible cures have been imposing either upon themselves, or upon the public, or upon both, for when practical trial has been made, in some cases even

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in the presence of the patentees or pseudo-philanthropists themselves, the appliances refused often to act satisfactorily, and would be doing exactly the opposite of what they were warranted to do.

I think Mr. Thompson claims too much for his system, and I consider it unnecessarily expensive. Rooms of dwelling-houses can be much better ventilated by using the chimney already in than going to the expense of building or putting in a special extra flue in the way he proposes. Moreover, might I ask Mr. Thompson how he is going to get the sun to shine at night, when it is most wanted to heat up his slates and pipes to make his system work? W. P. BUCHAN.

Glasgow,
March 4, 1884.

THE HOUSING OF THE POOR.

IMPROVED WORKMEN'S DWELLINGS IN LEEDS.—Mr. J. N. Sharp has erected in the neighbourhood of Pontefract Lane, Leeds, healthy, compact, and convenient houses, constructed of good materials and at such a price as to admit of a fair return for the outlay with rents at 4*s.* 10*d.*, 4*s.* 3*d.*, and 3*s.* 8*d.* per week, these sums in each case including the rates. There are fifty-six 'through houses,' each of which has two cellars in the basement, a sitting-room and a kitchen on the ground-floor, and above there are two bedrooms, and an attic 9½ yards by 4 yards. Each house is supplied with hot and cold water, the copper cylinder in connection with the hot-water apparatus being fixed in a corner of a wardrobe in one of the bedrooms. In the attic there is a bath, with hot and cold water taps. Each house is also fitted with a steam washer, which must prove a great advantage. In front there is a small piece of garden-ground and a closet. For such houses a rent of 4*s.* 10*d.* per week, clear of rates, is charged. The second size of houses contain cellars, kitchen, scullery with hot and cold water taps and steam washer, two bedrooms (one with a wardrobe), and a large attic with a bath. There are sixty-three houses of this description, which are let at a rent of 4*s.* 3*d.* per week, clear of rates. There are thirteen houses of a smaller size, which have cellar, kitchen with hot and cold water taps and steam washer, a bedroom containing a wardrobe, and an attic with a bath. For these the rent is 3*s.* 8*d.* per week clear of rates. The drainage of these dwellings is carried out on the latest principle, special care being taken to prevent the entrance of sewer gas into them. Mr. J. Cropper, M.P., who was a member of the Artisans' Dwellings Committee of the House of Commons, recently visited these houses, and stated that the convenience, for the low price, surpassed his experience, which was large. It is scarcely necessary to say that Mr. Sharp has no difficulty in obtaining respectable tenants; and the *Leeds Mercury*, whence this account is abridged, points out that if other builders would follow his example, the problem how to provide cheap and healthy houses for artisans would soon be solved, at least so far as Leeds is concerned.

SPEAKING at the opening of the lecture session in connection with the Northampton Club, Northampton Square, Clerkenwell, Lord William Compton referred to the dwellings of the London poor as he had found them not only on the estates of his father, the Marquis of Northampton, in Clerkenwell, but generally throughout the metropolis. He did not think, he said, that the Royal Commission about to be constituted would prove of any very great use or learn much more as to the housing of the London poor than was already known. He believed the existing laws were sufficient to remove most, if not all, the evils complained of, but in his visits to the worst parts of the metropolis he discovered that the local authorities had, as a rule, failed to enforce the laws with the administration of which they were entrusted. Clerkenwell compared tolerably favourably with other districts, but there were many underground kitchens in that parish which should be declared unfit for human habitation. The chief evils from which the poor suffered were high rents, the dilapidated state of their dwellings, and overcrowding. It would be desirable for the Royal Commission to know from the industrial classes themselves what they would deem a fair rent for the improved accommodation they needed. The very poor were unable to pay the rents required for model dwellings, and it was necessary that workmen should be provided with houses near their work, where they could dine, and exercise control over their own households. He objected to middle men—sub-tenants—those between the owners and the actual tenants, who exacted most exorbitant rents from the poor for the wretched accommodation they afforded. He thought the poor needed an improved water supply and cheap baths and washhouses (see p. 432), and he also suggested that the police might be empowered, with reasonable safe-guards securing due liberty of the subject, to inspect tenements where overcrowding and unsanitary conditions were suspected to exist. A discussion followed, in which Lord Compton intimated his willingness to receive any suggestions in writing from his audience on this subject, and pass them on to the Royal Commission.

THE IMPROVED INDUSTRIAL DWELLINGS COMPANY. At the forty-first half-yearly meeting of this company, Sir Sydney H. Waterlow, Bart., M.P., in the chair, the report read stated that the capital account now amounted to 462,500*l.*, and 37,500*l.* more had been called up. Loans had been received from the Public Works Loan Commissioners amounting to 327,000*l.*, and 671,000*l.* more was expected from them, for other works to be at once undertaken. The revenue account showed a profit of 14,743*l.*, admitting of the usual dividend of 5 per cent., carrying 3,000*l.* to the reserve fund, which now amounts to 55,500*l.* Fifteen months ago plans and specifications had been submitted to the Metropolitan Board of Works respecting the erection of improved dwellings in Mint Street, Borough; but such difficulties had been thrown in their way by the Board that the directors had reluctantly been compelled to stop the work going on. The chairman, in moving the adoption of the report, remarked that they might take some credit to themselves for what they had done during the twenty years they had been engaged in their work. They began with a capital of 50,000*l.*, and the report told them what they had got to lately.

THE Marquis of Salisbury has subscribed 100*l.* towards the expenses of the Mansion House Council in relation to the dwellings of the poor.

IN their report for the half-year ending Dec. 31, 1883, the directors of the Dublin Artisans' Dwellings Company state that the entire revenue for the half-year amounts to 3,335*l.* 8*s.*, which, after providing for all expenses, leaves a balance of 1,655*l.* 4*s.* 11*d.*, out of which the directors recommend a dividend at the rate of 4 per cent. per annum.

AT the twenty-third half-yearly meeting of the Cork Improved Dwellings Company the report presented showed a nett balance to profit of 845*l.* 2*s.* A dividend at the rate of 5½ per cent. per annum on capital paid upon old shares was declared, 313*l.* 17*s.* 9*d.* being carried forward to next account.

THE following appears in the March number of the *Nineteenth Century*. A Society for the Enforcement of Sanitary Laws and the Improvement of Dwellings.—Committee: The Baroness Burdett-Coutts, Miss Octavia Hill, the Earl of Shaftesbury, the Earl of Dunraven, the Right Hon. Sir R. Assheton Cross, M.P., the Right Hon. G. Shaw-Lefevre, M.P., Mr. Samuel Morley, M.P., Mr. Thomas Burt, M.P., the Rev. Samuel A. Barnett, Mr. H. O. Arnold Forster, and Mr. James Knowles. It is admitted by all acquainted with the subject that very

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many of the evils suffered by the poor could be reached and dealt with by the existing law if it were properly known and applied. It is believed also that volunteer action might do much in spreading a popular knowledge of the law and in helping to enforce it. A society having these special objects and acting in harmony and correspondence with all other public bodies concerned with improving the dwellings of the poor, is accordingly proposed, and the above-mentioned names have been agreed to as its committee. By taking charge, on the principle of the division of labour, of one department of a huge subject, such a society may hope to relieve other bodies of part of their work and to assist the common cause by co-operation. (The committee, which was constituted before the formation of the Mansion House Council, proposes to act in full correspondence with it, as well as with previously existing organisations.) A limited number of members will be invited by the committee to join the society, and will be expected to contribute personal effort, influence, advice, or information, rather than money. The object of this public notice is to make known the existence of the society to all whom it may concern, and to invite information, authenticated by names, dates, and addresses, as to any particular cases of hardship or misery (in London), which are traceable to evasion or neglect of the existing law. Communications may be addressed to the honorary secretary at 17 Albert Mansions, Victoria Street, S.W.

ANSWERING Mr. R. Power in the House of Commons with reference to the working of the Irish Labourers Act, Mr. Trevelyan said that petitions had been presented by sanitary authorities for orders relating to 570 schemes, which would involve the erection of 4,700 to 5,000 dwellings, and loans ranging from 450,000*l.* to 500,000*l.*

PARKS AND OPEN SPACES.

MR. WARDLE, of Newton Hall, recently read an interesting paper before the local branch of the Arboricultural Society in Newcastle-on-Tyne, on 'Tree-planting in Towns.' After dwelling at some length on the benefit of tree-planting from a sanitary point of view, Mr. Wardle pointed out that the most frequent cause of failure was the careless selection of trees with more regard to their foliage, than to their suitability to the soil and climate to which they were transplanted.

An effort is being made to acquire the burial-ground of St. John's, Westminster, as an open garden for recreation purposes. The ground is nearly two acres in extent, having two frontages of equal length, and, being well timbered, it is admirably suited for a public garden in the midst of the extremely poor neighbourhood in which St. John's parish is situated. A faculty has been granted by the Consistory Court for this object, and the Duke of Westminster has contributed 1,000*l.* towards the formation of a public garden on the disused burial-ground. A committee, of which Mr. F. Seager Hunt is treasurer and Mr. Charles Wright hon. secretary, are now interesting themselves to obtain by voluntary subscriptions the remainder of the amount required.

The Court of Assistants of the Grocers' Company have voted the sum of 10*l.* 10*s.* in aid of the funds of the Metropolitan Public Garden, Boulevard, and Playground Association, the address of which is 83 Lancaster Gate, W.

There has been issued a copy of a report under the Commons Act, 1876, for the regulation of Redhill and Earlswood Commons. The report arranges for the appointment of conservators, with directions as to management and drainage, and with powers to frame by-laws, to be approved by a Secretary of State, and for the reservation of the rights of the inhabitants of the neighbourhood over the common, subject to the rights of the lords of the manor of Reigate.

SANITARY JOTTINGS.

SANITARY.

THE financial results of the popular course of health lectures recently delivered in the lecture room of the Literary and Philosophical Society at Newcastle have been satisfactory. After paying all expenses, the balance of 24*l.* was handed over to the treasurer of the Clapham Memorial Home.

A court, long of evil repute, at the back of St. Pancras Church, containing about 1,000 inhabitants, has been purchased by a few ladies and gentlemen. It has been thoroughly put in repair, and is being let on the system of Miss Octavia Hill.

At the annual meeting of the Staffordshire Cocoa House Company at Wolverhampton, the directors declared a dividend of 10 per cent. out of last year's profits, and carried forward a balance of 49*l.* During the year they had purchased the freehold of their Bilston House for 880*l.*, without mortgaging or increasing their capital. Nearly all their houses in Wolverhampton and district are doing a good business.

A handsome drinking fountain has been erected in Queen Street, Newton Abbot, by Mr. Leonard Armstrong, the late medical officer of health.

At the Police Court of Bournemouth, Charles Pond was charged with an offence against the sanitary by-laws. It was shown by the medical officer of health that the premises were not only in a filthy condition, but highly dangerous to health, and further that there were twenty-eight occupants in the house, and that out of that number a female and four children occupied as a sleeping and living room a cellar. The defendant was fined 4*l.* and costs.

SMOKE ABATEMENT.

At the South Shields County Court, Messrs. Gibbs, Johnson, & Co., metal extractors, Jarrow, were sued for 50*l.* damages by Mr. R. A. Smith, inspector under the Alkali Works Regulation Act, for permitting the escape of hydrochloric gas from their works. The offence was admitted, but, in consequence of the defendants having built a large chimney in order to prevent the repetition of the nuisance, the judge mitigated the penalty to 10*l.*, with costs on the highest scale.

NOTICES OF MEETINGS.

STATISTICAL SOCIETY.

THE Fifth Ordinary Meeting of the present session will be held on Tuesday, the 18th instant, at the Royal School of Mines, Jermyn Street, S.W., London, when a Paper will be read on 'The Recent Declines in the English Death Rate, considered in connection with the Causes of Death,' by G. B. Longstaff, Esq., M.A., M.B.Oxon., L.R.C.P. The chair will be taken at 7.45 P.M.

COMPETITIONS.

INTERNATIONAL HEALTH EXHIBITION.

THE Council of the Society of Arts announce that they are prepared to award the following prizes in connection with the International Health Exhibition:

Under the John Stock Trust, a Society's Gold Medal or £20, for the best example of sanitary architectural construction, Classes 20, 28, 29, 30, 32.

Under the Shaw Trust, a Society's Gold Medal or £20, for the most deserving exhibit in Classes 41, 42, 43, and 45 (relating to Industrial Hygiene).

Under the North London Exhibition Trust, a Society's Gold Medal or £20, for the best set of specimens illustrating the handicraft teaching in any school—Classes 49 and 50.

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Under the Fothergill Trust, Two Gold Medals (or two sums of £20). one for the best exhibit in Class 27 (Fire Prevention Apparatus), and one for the best exhibit in Class 26 (Lighting Apparatus).

From the Trevelyan Prize Fund, Five Gold Medals (or five sums of £20), for the best exhibit in each of the following Classes—2, 3, 6, 7, and 11 (all comprised within Group 1, "Food").

Each prize will be a Gold Medal, or the sum of £20, at the option of the recipient.

The Council propose to ask the juries in each class to recommend for their consideration either two or three exhibits which they might consider deserving a prize.

HARDY PLANTS.

In view of the International Health Exhibition, the committee of the Botanical Society, Regent's Park, has offered a prize for competition, to be awarded on June 18, for groups of plants suitable for growing in dwelling-houses lighted by gas.

THE CALCUTTA EXHIBITION.

The highest award (gold medal) has been adjudged to the Silber Light Company for lamps.

APPOINTMENTS UNDER THE PUBLIC HEALTH ACT.

Medical Officers of Health.

Angus.—Dr. Angus has been appointed Medical Superintendent to the Hospital for Incurables, at Newcastle-on-Tyne.

Brown, William, L.R.C.P.Edin., F.R.C.S.Edin., has been re-appointed Medical Officer of Health for the Carlisle Urban Sanitary District, at £150 per annum, for three years.

Calderwood, George, M.D.Univ.Glasg., has been appointed Medical Officer of Health for the Egremont Urban Sanitary District, Cumberland, at £20 per annum, *vice* Syme, deceased.

Day, Edward Joseph, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Dorchester Urban Sanitary District, at £10 10s. per annum, for three years.

Gange, Frederick Abner, M.D.Univ.St.And., M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Faversham Rural Sanitary District, Kent, at £150 per annum.

Joy, Frederick William, L.R.C.P.Edin., M.R.C.S.Eng., L.S.A. Lond., has been re-appointed Medical Officer of Health for the Thetford Urban Sanitary District, at £20 for one year.

Lace, James Irving, L.R.C.P.Edin., L.F.P.S.Glasg., has been appointed Medical Officer of Health for the Arlecdon and Frizington Urban Sanitary District, Cumberland, at £25 per annum, *vice* Syme, deceased.

MacGregor, Duncan Alistair, M.B., C.M.Edin., has been re-appointed Medical Officer of Health for the combined Cumberworth, Shelley, Shepley, and Skelmanthorpe Urban Sanitary Districts, at £50 per annum, till December 25, 1886.

Mayou, George, M.D.Univ.St.And., M.R.C.S.Eng., L.S.A.Lond. has been re-oppointed Medical Officer of Health for the Monmouth Urban Sanitary District, at £25 for one year.

Meade, George B. Owen, L.R.C.P.Lond., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Newmarket Urban Sanitary District, at £25 for one year.

Scott, Thomas, M.D.Univ.Edin., L.R.C.S.Edin., has been re-appointed Medical Officer of Health for the Ilkley Urban Sanitary District, Yorkshire, at £30 for one year.

Swann, Alfred, M.D.Brussels, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Batley Urban Sanitary District, Yorkshire, at £40 for one year, *vice* Bayldon.

Webb, Charles Frere, F.R.C.P.Edin., has been re-appointed Medical Officer of Health for the Basingstoke Urban Sanitary District, at £60 for one year.

Woodward, William, M.D.Univ.St.And., L.R.C.P. Lond., has been re-appointed Medical Officer of Health for the Malvern Link Urban Sanitary District, Worcestershire, at £12 for one year.

Surveyors, Clerks to Guardians, Inspectors of Nuisances, &c.

Bellarby, Mr. Henry Thomas, Manager of the York City and County Branch Bank. Doncaster, has been appointed Treasurer to the Crowle Local Board and Urban Sanitary Authority, *vice* Leatham, resigned.

Beresford, Mr. Samuel, has been re-appointed Inspector of Nuisances for the Huntingdon Urban Sanitary District, at £20 for one year.

Burden, Mr. John, has been appointed Collector to the Ashford Local Board and Urban Sanitary Authority, at £40 per annum, *vice* Homewood, resigned.

Carnell, Mr. Thomas John, has been appointed Collector to the Ottery St. Mary Local Board and Urban Sanitary Authority, at £25 per annum, *vice* Berry.

Chick, Mr. William, has been re-appointed Inspector of Nuisances for the Dorchester Urban Sanitary District, at £15 for one year.

Clark, Mr. William, has been appointed Inspector of Nuisances and Surveyor of Highways to the Malmesbury Rural Sanitary and Highway Authority, at £60 and £140 per annum, *vice* Hitchings.

Coe, Mr. W. J., has been re-appointed Inspector of Nuisances and Inspector under the By-laws, for the Faversham Rural Sanitary District, Kent, at £90 and £10 per annum.

Compton, Mr. T. Morant, has been re-appointed Inspector of Nuisances for the Carlisle Urban Sanitary District, at £125 for one year.

Eaglesfield, Mr. William Liddle, has been re-appointed Surveyor and Inspector of Nuisances to the Workington Local Board and Urban Sanitary Authority, at £150 per annum, for three years.

Edwards, Mr. Daniel, has been appointed Inspector of Nuisances to the Llandudno Improvement Commissioners and Urban Sanitary Authority, at £65 per annum, *vice* Jones, to be Collector only.

Edwards, Mr. Owen Lewis, has been appointed Town Clerk and Clerk to the Urban Sanitary Authority of Pwllheli, at £40 per annum, *vice* Owen, resigned.

Ellis, Mr. Thomas, has been re-appointed Inspector of Nuisances for the combined Cumberworth, Shelley, Shepley, and Skelmanthorpe Urban Sanitary Districts, at £20 per annum, till Dec. 25, 1886.

Fenn, Mr. Thomas, has been re-appointed Surveyor, Inspector of Nuisances, and Collector to the Short Heath Local Board and Urban Sanitary Authority, Staffordshire, and his salary increased from £35 to £50 per annum.

Gresswell, Mr. Charles, Branch Manager, London and South Western Bank, has been appointed Treasurer to the Ottery St. Mary Local Board and Urban Sanitary Authority, Devonshire, *vice* Whitaker.

Harland, Mr. Henry, has been appointed Surveyor to the Felling Local Board and Urban Sanitary Authority, co. Durham, at £150 per annum, *vice* Green, resigned.

Jones, Mr. Joseph Parry, Solicitor, has been appointed Town Clerk and Clerk to the Urban Sanitary Authority of Oswestry, at £160 per annum, *vice* Davies, deceased.

Lane, Mr. Edward, has been re-appointed Surveyor and Inspector of Nuisances to the Wokingham Local Board and Urban Sanitary Authority, at £52 for one year.

Lloyd, Mr. William A., has been appointed Surveyor and Gas Manager to the Lytham Improvement Commissioners and Urban Sanitary Authority, Lancashire, at £150 per annum, *vice* Bower, resigned.

Lunn, Mr. Edward Langrish, has been appointed Surveyor to the Guildford Rural Sanitary Authority, for that portion of Stoke which is within the district, at £15 per annum.

Moxon, Mr. William, has been appointed Treasurer to the Towcester Guardians and Rural Sanitary Authority, Northamptonshire, *vice* Hewitt, deceased.

Myers, Mr. C. A., has been appointed Collector to the Lytham Improvement Commissioners and Urban Sanitary Authority, *vice* Bower, resigned.

Shaw, Mr. George, has been appointed Clerk to the Chesterfield Guardians and Rural Sanitary Authority, at £120 per annum as Clerk to the Guardians, £100 per annum as Clerk to the Rural Sanitary Authority, and such additional remuneration as may be fixed annually as Clerk to the Assessment Committee, and to the School Attendance Committee, and fees as Returning Officer and Superintendent Registrar of Births, &c., *vice* Cutter, resigned.

Sparke, Mr. James J., has been appointed Clerk to the Thingoe Guardians and Rural Sanitary Authority, Suffolk, at £100 per annum as Clerk to the Guardians, £15 per annum as Clerk to the Rural Sanitary Authority, £15 per annum as Clerk to the School Attendance Committee, and such salary not exceeding £20 per annum as may be fixed annually, as Clerk to the Assessment Committee, *vice* Mr. James Sparke, deceased.

Whitworth, Mr. John, has been appointed Collector to the Rowley Regis Local Board and Urban Sanitary Authority, Staffordshire, at 2½ per cent. commission, with extra payment for making rates, *vice* Taylor, resigned.

Wood, Mr. John Gibbon, Solicitor, has been re-appointed Clerk to the Harborne Local Board and Urban Sanitary Authority, Staffordshire.

Worrall, Mr. W. H., has been re-appointed Collector to the Harborne Local Board and Urban Sanitary Authority.

Vacancies.

Medical Officer of Health for the Camborne Urban Sanitary District.

Medical Officer of Health for the Barnstaple Urban Sanitary District.

Medical Officer of Health for the Helston Rural Sanitary District.

Medical Officer of Health for the Ottery St. Mary Sanitary District.

Medical Officer of Health for the Phillack Urban Sanitary District.

Medical Officer of Health for the Redruth Urban Sanitary District.

Clerk to the Westminster District Board of Works and Sanitary Authority, and to the Vestries of St. Margaret and St. John, £250 and £200 per annum. Application, March 29, to Warrington Rogers, Esq., Town Hall, Caxton Street, Westminster.

Clerk to the Gainsborough Local Board and Urban Sanitary Authority.

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CLERK to the Milverton Local Board and Urban Sanitary Authority, Warwickshire.
TREASURER to the St. Anne-on-the-Sea Local Board and Urban Sanitary Authority, Lancashire.
SURVEYOR and INSPECTOR OF NUISANCES to the Haverhill Local Board and Urban Sanitary Authority, £100 per annum.
INSPECTOR OF NUISANCES for the Tiverton Rural Sanitary District, £40 per annum.
SURVEYOR to the Bromsgrove Improvement Commissioners and Urban Sanitary Authority.

LOCAL INTELLIGENCE.

THE Derby Town Council and Urban Sanitary Authority have increased the salary of Mr. William Iliffe, the Medical Officer of Health, to £200 per annum.

The enactment contained in Section 90 of the Public Health Act, relating to by-laws as to houses let in lodgings, has been declared by the Local Government Board to be in force within the Local Board district of Willesden.

The Chippenham Guardians and Rural Sanitary Authority have been invested by the Local Government Board with urban powers, rights, &c., under Sects. 157 and 158 of the Public Health Act within the contributory places of Box, Chippenham, Colerne, Corsham, and Lacock, as from the 17th inst.

The Bristol Town Council have increased the salary of Mr. Daniel Travers Burges, the Town Clerk and Clerk to the Urban Sanitary Authority, from £1,000 to £1200 per annum.

The Huddersfield Town Council and Urban Sanitary Authority have voted £300 to Mr. Richard S. Dugdale, C.E., the surveyor, for extra services in connection with the construction of the public parks and other works.

The Henley-on-Thames Local Board and Urban Sanitary Authority is to be dissolved at Lady-day. Special meetings of the Local Board and Town Council have been held, at which the Draft Provisional Orders, to be issued by the Local Government Board, were approved and signed by the respective chairmen.

At Brackley, Northamptonshire, on Thursday, the 1st instant, a statutory meeting of owners and ratepayers was held, at which the following resolution was carried by 26 to 1:—'That in the opinion of this meeting it is expedient that the parishes of Brackley St. Peter, and Brackley St. James, in the county of Northampton, should be constituted a Local Government district.'

There were nearly 200 applicants for the office of Inspector of Nuisances for the Auckland Rural Sanitary District, at £120 per annum and railway travelling expenses.

NOTES AND QUERIES.

Having for some time back been in the receipt of Queries appertaining strictly to sanitary work, and which it would be easy to answer, without having to refer our correspondent to competent professional advisers, we have opened a column in which to register such Queries and Replies thereto as can fairly be expected from us; and our subscribers and readers are invited to make such use of this column as will tend to benefit themselves and the community. Both Queries and Replies will, however, be subjected, if unnecessarily long, to a strict curtailment.

116. WATERWORKS CLAUSES ACT, 1847.

feel very thankful to you for opening your columns to such as I and others, not only to make known some of our many grievances, but also to enlighten us sanitary inspectors upon many things in law and practice that we as a class are supposed to be ignorant of, and yet expected to carry out to the letter. From what experience I have had in office as inspector, poor law guardian, or a town councilman (I have been all these) for the last thirty years, the sanitary inspector is looked upon as the lowest grade of all officers connected with sanitary authorities. The Board will take the word of a medical officer or an engineer, be it ever so far at variance with facts; and yet, when any difficult matters come before them in connection with nuisances, zymotic diseases, whether as isolated or in an epidemic, the inspector is the first man that must face the danger. Few and far between are the persons that have any idea of the multifarious trials and difficulties with which a rural sanitary inspector has to contend. Urban inspectorship bears no comparison to the difficulties and contentions through which a rural sanitary inspector has to fight in order to succeed in his duties. Having given my opinion as above, I now come to a question or two with which I intend to trouble you. This district is so diversified with hills and dales, parts semi-urban, the rest as rural as any part in the kingdom, that we have much trouble to get a water supply for the inhabitants. In many parts of the rural portion thousands of the inhabitants have to depend upon old clay pits, where the rain that falls on the fields in winter and runs into these pits, lies stagnant, and, although myriads of animalculæ and other living creatures abound in these in summer, yet the people have to use this water for domestic purposes, as there is no pure water to be had in some places near their dwellings, no springs or rivulets; and if they sink wells, they have to go forty or fifty yards through solid clay before they come to water, and, when found, it is seldom fit for use. Yet on the hills we have abundance of springs and rivulets of the purest quality, advantage having been taken of these by men, who have formed themselves into water companies, to supply various parts of the district, and the sanitary authorities and these companies are often at loggerheads as to what is the duty of one towards the other. One of the grievances is that where the inhabitants are crowded the companies will readily supply them with water, but where the inhabitants are a little scattered they are very slow in taking the water to them, and take advantage of section 62 of the Public Health Act of 1875, trusting to the sanitary authority to enforce the supply of water on the people, which is no sooner done than the companies refer the sanitary authority to sects. 35 and 36 of the Waterworks Clauses Act of 1847, and claim not only to per cent. for three years, but contend that they have the right to demand it a longer number of years, basing their argument on the phrase in sect. 36, 'and tender made of an agreement signed by such numbers of owners or occupiers as aforesaid, to take and pay for a supply of water for three years *or more*.' This 'or more,' they argue, is the pith of the section, and the phrase in sect. 35, 'shall not be less than *one-tenth* part of the *expense* of providing and laying down such pipes.' If you, or any of your correspondents, could give a lucid and clear explanation it would confer a great boon, I have no doubt, on others, besides on your humble servant. Again, the Amended Public Health (Water) Act of 1878 has been a great stumbling-block in our way to supply the public with water. The double notices are a farce; before this Act came in force we could give notices to supply water within so many days or weeks, as circumstances required, but under this Act we cannot, in any case, enforce it under five weeks; besides, the information and the notices must pass through different officers' hands. Why not allow the officer who finds such notices are necessary to be given, to do so at once, and not waste time in going from one to the other? One question more. Have water companies power to take away taps that supply water (with the consent of the owner), and fix what is called a 'self-closing tap,' to serve ten or twelve houses not in a common yard? Ought not the convenience of the tenants to be consulted? As commenced here now, some of the inhabitants will not get one-fourth of their due.—H. D.

[Unless their special Act alters their duties in this respect, your water company are bound under sects. 35 and 36 of the Waterworks Clauses Act, 1847, to lay down pipes for the supply of water to any part of the district in which the owners and occupiers of houses will bind themselves to take water for three years, and to pay during that period water rates amounting in the whole in each year to not less than one-tenth of the cost of providing and laying down such pipes. Section 36 does not enable the company to insist on payment for a longer period than three years; but if any owners or occupiers like to agree for a longer period, of course they can do so. The penalty in case the company refuse to supply water after being duly required to do so, is provided by section 36; and, in order to enforce it, you will have to take proceedings in the names of the respective owners and occupiers who are refused their supply. 2. The alteration in the tap is very possibly made under some clauses in the company's private Act. If the landlord approves of the new tap, it seems that there is no power for any one else to object to it, unless it can be shown that the tenants are entirely deprived of their water supply by it. You must state the facts more fully in order to enable us to answer this query with any certainty.—ED.]

117. A BATCH OF QUERIES.

1. Is 12 yards about the proper distance apart for the under drain of an irrigation area of sandy soil?
2. Is 3 feet the proper depth?
3. Is any special arrangement recommended for preventing the sand filling up the pipes?
4. What is the proportion of oil of peppermint and water for testing drains?
5. Is it necessary for this test to plug the drain outside the house wall?

S. P. S.

[1, 2, 3. You must consult an expert engineer upon the matters embodied in these questions, as so very much depends upon the *exact* kind of subsoil and, especially, upon the extent of the irrigation ground and kind of crops to be raised. 4, 5. For a very full description of this test and the method of conducting it, see our issue of Feb. 15, 1883, pages 351-2. If the essential oil of peppermint be used, a teaspoonful will suffice for the very largest house, properly mixed with hot water. The person who distributes the charged water should not be allowed to enter the house.—ED.]

118. THE ABATEMENT OF NUISANCES.

Would you kindly give me your opinion on the following, viz:—In a case taken under sect. 91 and following sections of P.H.A., 1875, to abate a nuisance by providing privy and ashpit accommodation where none exists, although no filth was found on the premises at the time of inspection; are these sections sufficient to procure a justice's order for accommodation to be provided, or should proceedings have been taken under sect. 36? A SUBSCRIBER.

[Sect. 36 is the one properly applicable to the case of a house without privy or ashpit accommodation. It is only by a strained interpretation that such a case could be brought within the words of sect. 91 at all. Under it, if a nuisance exists, the local authority can require it to be removed, and justices can make an order to enforce this being done; but it has been decided that sect. 94 does not authorise them to require the erection of such a closet as the local authority think proper, and to have its erection enforced by an order of justices (*ex parte* Whitchurch, decided by Pollock B. and Stephen J., on March 5, 1881). Such orders may be made under sect. 36, and from them there is a right of appeal to the Local Government Board.]

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ORIGINAL PAPERS.

THE DWELLINGS OF THE POOR IN LARGE TOWNS.*

By ELIJAH HOOLE.

HAPPILY there is now no need to insist on the importance of housing the poor, or on the pressing necessity of putting an end to the squalor and to the degrading surroundings in which the labouring classes are crowded. Public attention is aroused, and the danger now seems to be, not that nothing will be done, but lest some great effort should be made to end at a stroke a condition of affairs which has been the growth of centuries, and has largely resulted from long-continued neglect.

It may be affirmed, without risk of contradiction, that no sudden remedy, however extensive, can possibly deal effectually with the degradation and poverty of the lowest stratum of our town populations. Could you put them all in the best-arranged model dwellings to-morrow, their condition would be worse instead of better, unless you are prepared at the same time to control and educate them by experienced and properly-qualified persons, who have themselves undergone a special training to fit them for this difficult work. The improvement of the condition of the labourer is necessarily gradual, since it depends, not on rebuilding the dwellings merely, but on dealing with the various causes which combine to produce the deplorable results which have lately had so much public attention.

In the meantime, while the work is still undone, any approach towards the solution of the very difficult problem thus presented may not be without value, especially when embodying the results of actual experience.

There are two main divisions of the subject which must be carefully distinguished at the outset—the housing of the artisan, and the housing of the labourer. These two terms may be allowed to stand for the two great divisions of the working class, the skilled and the unskilled workers.

The first half of the question has been successfully met. For the upper working class the various dwellings companies have provided decent and healthy homes, which, though somewhat monotonous in appearance and arrangement, are an infinite improvement upon the courts and alleys they have usually replaced. The financial part of the problem has also been successfully treated, and it is now only necessary to repeat, with some obvious improvements, what the dwellings companies have done, and the entire artisan class may be housed in a healthy and comfortable manner, while the investment will return a fair percentage on the capital employed. The excellent service which the dwellings companies have thus rendered the artisan is too well known, and their comfortable sets of rooms, better furnished with useful appliances than many houses of the middle class, are too familiar to need detailed description. The object of the present paper is to endeavour to point out how what has been so successfully done for the artisan may also be done for the labourer.

It appears to have been supposed by their promoters that by providing sets of rooms in model dwellings they would be able so to raise the condition of the labourer that he would no longer live in the squalid manner in which he is still found, but would inhabit a set of rooms which would form a well-arranged and cheerful home for his family. One can hardly believe that the class most in need of healthy housing—the lowest—would have been deliberately passed by without one effort for its improvement. Be this as it may, the fact remains that while the *élite* of the working class has been thus provided for, the squalid poor of the lowest stratum have been left almost entirely to their own misery.

In 1873 about 27,000 persons were living in the improved dwellings provided by the various companies, &c., and, in 1881, these tenants had increased to nearly 39,000, but only a small proportion of these were of the labouring class, the majority being artisans. Now, as the inhabitants of the slums of London are estimated at 200,000, it is obvious that even if all the improved dwellings were exclusively occupied by them, there would still be a great work to do. But so far from occupying the improved dwellings, the labourer is excluded from them almost without exception both by the rent and by the kind of accommodation provided.

The dwellings companies provide a set of rooms, but he can only afford one, the rent of a set of rooms being quite beyond his means. He needs accommodation for carrying on his trade, but if they do not actually forbid its exercise, they can afford him no facilities or space for practising it. But if the dwellings do not suit the labourer, neither does the labourer, as a tenant, suit the proprietors of the dwellings. The lowest strata of our town population are the most difficult to control, and to keep within sanitary and orderly limits. There are very strong reasons for the apparent neglect of the squalid poor by the dwellings companies. They are by no means an easy class to deal with. Very destructive to their dwellings if not watched and controlled, using every artifice to avoid payment of rent, and constantly changing their lodgings, they require a special organisation for their management, an organisation which has time to inquire into the character and habits of the tenants, which recognises other crimes beside the non-payment of rent, and will either reform or eject the thief and the prostitute, though they can often pay higher rents than the labourer and the laundress.

An entirely different agency is thus required for collection, needing much more discretion and judgment than is necessary in dealing with the artisan. Insisting on the payment of the rent, and yet ready to make allowance for illness, and even to distribute relief.

A serious difficulty arises from the fact that occupying rooms side by side with the honest and industrious, are the vicious of both sexes, many of whom have sunk down to their present degraded position from a much higher level, and who infect their neighbours, while they themselves are debased by their own squalid surroundings.

It is hopeless to attempt to eliminate the vicious and debased from any scheme of housing the poor. If you select the deserving only, and provide for them, you merely leave the rest to a more hopeless degradation. To pick out the few good specimens that we can find, and to leave the rest, will never produce satisfactory results. The class must be dealt with as a whole. In considering how best to house the labourer, existing conditions must be accepted as fixed, since we have no power to alter

* Read before the Society of Arts, April 2, 1884.

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them. The wages of the labourer are fixed by the supply and demand of labour in the market. House rent is fixed by the cost of building, the amount of taxation, and the value of land. To alter either wages or house rent is impossible, since they are regulated by conditions quite beyond our control.

It will be seen that the various questions with which we have to deal are thus much narrowed. We have not to make or even to modify the conditions under which the labourer exists, but have to see what can be done to improve his position while keeping strictly within their lines. Help him to higher wages if you can, help him to lay out his money to the best account, but do not offer him rooms at 5*s.* per week when he has only 3*s.* to spend; and above all, do not try to house him by charity by giving him more than his money is worth. Such a proceeding can only be very partial in its application, is calculated to check rather than to extend the proper housing of the poor, and pauperises the recipient instead of benefiting him. In other matters beside that of price, existing conditions must be accepted. It is useless to approach the subject with preconceived theories, such as, for instance, that every family ought to have three rooms, or that no room ought to be used both by day and night. What has to be done is to see how the labourer is lodged now, and how his dwelling may be improved without raising the rent above his means. As a rule, he with his family occupies one room only in an eight or ten-roomed house, originally planned for one family, but now containing one family in each room. When the house was built it was provided with sanitary and washing appliances for one family, and these, in a more or less dilapidated condition, are now made to serve for eight families or more. We have had many descriptions of the state of such tenements of late. Suffice it to say, that unless repairs are done by the tenant himself, at his own expense, they are often omitted altogether. Not only do families live and die in these single rooms, but in many of them trades are carried on. Tailoring, cobbling, laundry-work, and a host of small trades are practised in the single rooms, which are thus both sleeping rooms, living rooms, and workshops in one. On these trades thus exercised the livelihood of the family largely, if not entirely, depends. The rent of single-room tenements ranges in London from about 2*s.* to 4*s.* per week, and includes all rates and taxes, with the cost of water supply, and of such repairs as the sanitary authority enforces.

This mode of living is by no means what could be wished for the labourer, whose exertions it might be supposed should surely procure for him some better surroundings, especially when the arduous nature of his work, and the risks and exposure he has to undergo in its pursuit, are considered.

To omit to provide single room tenements, under the plea that such a mode of housing the labourer ought not to be countenanced, is really to perpetuate the evils complained of in their worst form, since by careful superintendence they have been greatly mitigated, and by rearrangement nearly, if not quite, abolished; nor would it succeed to give two rooms at the price of one, since this would be simply to make a present of so many shillings a week to each family. It is clear that whatever is done must be done within the existing limits of wages, rent, and customary accommodation. The fact must be faced that hundreds of thousands of persons are living a family in a room, and that what is needed by them is the best room that can be had for the money they can afford to pay, with as much isolation from their neighbours, as much fresh air, pure water, and light as we can secure for them under the circumstances in which they are obliged to live.

Two methods are thus open in dealing with the dwellings of the labouring class. Either the existing dwellings may be taken in hand and rendered as far as possible healthy and sound, or they may be demolished and rebuilt on an improved plan. The first method, that of maintenance, is being carried on with increasing success, and is substantially as follows:—Either the lease or freehold of existing labourers' dwellings is purchased, the most squalid tenement houses being selected by preference. They are taken over, tenants and all, just as they are. A superintendent is appointed to keep order, the premises are thoroughly cleansed, overcrowding is stopped, the drainage and water supply are made efficient, dangerous defects in the structure are remedied, while repairs of a decorative kind are left to be granted to tenants who pay punctually and behave well. The tenants are not evicted, but they are put on trial, and only the incorrigible are at last displaced. This plan has worked exceedingly well, and can be quickly and easily adopted. It is also remunerative, and is often practicable where from shortness of lease and other causes rebuilding is impossible. The advantages to the tenants are immense and immediate. This system of management is a most valuable discovery, forming as it does the basis upon which alone any plan of improvement can safely be founded. It must, however, be regarded as a temporary measure preparing the way for permanent improvement. This plan being eminently practical, the houses to which it is applied form an excellent training ground for superintendents collectors and managers, without whose experienced aid any scheme for housing the labourers must inevitably fail.

The form in which the labourers' dwellings in town must be rebuilt is decided by the price of land and by the necessities of superintendence. Cottage homes, such as have been so successfully provided near London, for a low-waged class, at Clapham, at Harrow Road, and elsewhere, are out of the question on land costing more than 500*l.* per acre. Five or six stories must be built in London to put enough people on the ground to pay the ground-rent; and staircases and entrances must not be too numerous, or the difficulties of management will be greatly increased. Rebuilding in large towns must thus take the form of blocks. But there is no need for the blank, dismal exterior, or for the exact repetition of arrangement which characterise so many blocks of industrial dwellings. A much more homelike look might easily be given, and greater variety in the accommodation and arrangement might be secured by the exercise of a little tact and thought. No doubt the policy of encouraging all labourers whose work will allow them to live out of town is excellent, but it is, unfortunately, inapplicable to a very considerable number who must live near their work, and it is just this part of the question that presses for solution. Rebuilding has advantages of its own which can never be shared by the old tenement houses. By rebuilding we get rid of the accumulations of filth and vermin which make old tenements so loathsome. Sanitary defects are also remedied, tenements are isolated, so that

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infection cannot pass from one to the other, and are so placed as to be properly inspected and controlled by the superintendent. So far from a block of labourers' dwellings being necessarily repulsive or monotonous, it is found that the more attractive and cheerful in appearance it can be made, the more eagerly are the rooms in it sought after. Not merely does the value of land govern the form of building, but it has affected and will increasingly affect the position, if not the very existence, of the lowest stratum of our town population. The labourer living in town is at the mercy of the speculator for his home, and probably for his very existence. An increased demand for warehouse or office accommodation would make it profitable to buy up and demolish labourers' dwellings, in order to erect a superior class of building; indeed, this is going on now, and has been going on for many years past. The labourer may thus at any time be practically evicted from London and from our large towns, without power of resistance. Whether or not the conversion of the sites of labourers' dwellings to other purposes calls for legislative interference is a question well worth consideration. At present there is nothing to restrain the speculator who chooses to purchase the labourers' dwelling, and the land on which it stands, from destroying the houses, and from devoting the land to purposes which will exclude such dwellings for ever. The class evicted is helpless in the matter, having no capital wherewith to secure their homes. Other classes similarly threatened can combine and purchase their dwellings, but the labouring class, by the very condition of its existence, cannot do this, and surely is entitled to some protection. Under the Artisans' Dwellings Act, accommodation at least equal to that destroyed has to be provided. It would surely be well to extend this provision somewhat further, so that whenever low-class dwellings are destroyed an equal amount of house room should be simultaneously provided within a reasonable distance.

A case may be quoted which illustrates this necessity. The freehold of a court in the city is owned by a family living out of England. The number of interests in the freehold made it impossible to do anything but either to sell or to keep the old houses in repair as labourers' dwellings. To sell would have been more profitable, since the land is estimated at 2*l.* per foot, but to sell would mean the displacement of the tenants, and through consideration for them, the other alternative was chosen. After a time, the court is condemned by the authorities, and the tenants are turned out. But although the authorities can close the houses, they cannot compel the owner to build others for the labourer, and if things follow their natural course, the empty houses will be pulled down, and warehouses and offices will cover the site.

The rise in value of land from adjoining improvements furnishes another strong reason for securing the existing sites for labourers' dwellings from conversion to other purposes. The freeholder has usually extracted his rent from his tenants, and has expended little enough upon their dwellings. What little has been spent in repairs they have paid for perhaps several times over, but all round new buildings have sprung up, and have raised the price of land, and now it is too valuable for the purpose to which it has been so long applied. He, therefore, sells it for what it will fetch, and the tenants are turned out to crowd into slums already over full. Tenants who have passed their lives upon the soil have no claim to any part of the unearned increment which goes into the pocket of the absentee freeholder. It would at first sight appear a simple matter to secure a site for the kind of dwellings referred to, but in practice this is found to be one of the greatest difficulties which has to be encountered. Either the land is too highly priced, or is covered with worthless buildings bringing in a rental which must be paid for; or it is let on a lease too short to build on, or is the property of persons who cannot sell, or who are already pressing an undue profit from their wretched tenants. The leasehold system is a main obstacle in the way of rebuilding, and is a great encouragement to flimsy construction and scamping.

As an example of the difficulties in the way of improvement, take the case of a court in St. Pancras, probably one of the worst in the parish, thirty houses in which have recently been purchased and are now being managed by a dwellings company. The houses contain eight rooms each, and though originally built for one family, they now contain eight each. The squalor and degradation of the tenants is extreme. One of the City companies owns the freehold, and though anxious to do their duty as landlords were all but powerless, as leaseholders stood between them and the miserable tenants. Every few years a raid was made upon the leaseholders by the solicitor and surveyor to the company, who, by serving notices of dilapidation and breach of covenants, enforced a number of repairs. The solicitor's and surveyor's fees for enforcing these repairs absorbed nearly the entire receipts from the ground-rents in the intervening years, and thus the City company gained little but the odium attaching to the owners of such mismanaged property. But while, as freeholders, they only received the low ground-rents of the original lease, an enormously increased ground-rent was paid by tenants, and the difference went into the pocket of a speculator. When such property as this is purchased, the outlay is usually too large to allow of rebuilding, since a price has to be paid in proportion to the rental for which the squalid tenements are let. After the purchase a considerable further outlay has to be made in repairs. This case is one in which management only is practicable until the lease runs out.

Our building Acts contain no restriction upon the conversion of a house into tenements, and require no additional sanitary or other provision for the twenty or thirty extra people crowded into them, and no adaptation to their new purpose. Our building Acts define the size of a hearth to an inch, and they prescribe the thickness of a wall to half-an-inch, they enlarge at great length upon that sacred institution the party wall, but not one word do they say against making a house built for one family serve for ten, nor if this is done do they prescribe any addition whatever to the arrangements or accommodation.

The sites now occupied by the dwellings of the labourer will usually be found well placed for the convenience of the class they house, and though the existing dwellings may be overcrowded, the land now occupied, if properly laid out, would, without any crowding whatever, serve for a much larger number. For instance, in 1873 the population in some of the most crowded blocks in St. Giles was calculated at 400 to the acre. In Soho the *Lancet* Commission of 1874 reported that there were 428

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persons to the acre. Sir Sydney Waterlow, in 1875, said that it was easy enough to arrange for the accommodation of twice and thrice as many persons to the acre as there were at present. He could point to several blocks where there were more than 1,600 persons to the acre without the least overcrowding. In the sub-districts of St. Paul's, St. George's-in-the-East, and of Bethnal Green Church, two crowded East-end districts, the population, according to the census of 1871, was 281 and 202 to the acre. Mr. Moore, secretary to the Industrial Dwellings Company, says, speaking of the Whitechapel and Limehouse scheme, 'The Metropolitan Association for Improving the Dwellings of the Poor lodge 1,135 persons to the acre, including open spaces; and the Peabody Trustees have planned to lodge on the sites they have bought from the Metropolitan Board of Works 941 persons to the acre.'

What price may safely be given for land on which to house the poor is one of the first questions which has to be considered when either purchase or rebuilding is contemplated. As the circumstances of each site vary, it is impossible to lay down a hard and fast rule to apply to the cases, but in favourable positions 20,000*l.* per acre has not been found too high a price to yield a fair return upon the outlay. High-priced land has usually some special advantages to offer, and by utilising these, still more expensive sites may be brought well within the range of possibility. It is not necessary, or even desirable, when building labourers' dwellings, to mass a large number of this single class together, and to build for them only. On the contrary, it is advisable, both from a financial point of view, and for many other reasons, not to separate the labouring class from the rest of the population. Room can be found for many of this class upon sites too expensive to be given up to them altogether. The lower floors in many places would let well as shops, workshops, or offices, and might be surmounted by an upper floor or two of labourers' dwellings with separate access. The higher rents received for the lower floors would enable the upper rooms to be let at rents within reach of the labourer, while the buildings might be so arranged that no interference or inconvenience would result to either class of tenant from the proximity of the other. In an Italian palazzo you often find on the ground-floor a range of small shops and stables, while on the first-floor perhaps a duke lives, and the rents of the upper floors are gradually reduced, till the top terrace is reached. There are many buildings in London, and in our large towns, which would bear another storey or two to which separate access and outlook could be given. In this way a large labouring population could be housed without giving up valuable land exclusively to the purpose, and the separation of class from class, already too great, would be to some extent avoided. Hand-in-hand with the provision of new dwellings must go the demolition of the old. Demolition is as important as reconstruction, and the destruction of the old is essential to the success of the new dwellings. Demolition is necessary because the existing dwellings are saturated with filth and alive with vermin; because, having been built for one family only, they are unsuitable to the purposes to which they are now applied; because inspection and control are more difficult than in buildings specially planned for these purposes; and because light and air must be let into the narrow courts and alleys where the poor are crowded together. But there is another and more cogent reason still, and that is, that, as a rule, the poor people prefer the rookery to the model dwelling. They are accustomed to the dirt and squalor which strike a visitor so painfully, and they prefer the freedom from control and inspection which the rookery affords them. Cleanliness, too, means a certain amount of additional work, which they require some stimulus to make them undertake. But control and inspection are the essential elements of any scheme for housing the labouring class, and model dwellings without them would be quite as bad or worse than the slums. It may be urged that the labourer has a right to his freedom, a right to go his own way. But this he has had, and look at his condition. Severe and repressive measures are not advocated, a friendly intercourse between the landlord and tenant is rather what is needed to restore the labourer's self-respect, and to lift him out of the degraded position in which he is so often found.

One of the most important points upon which correct information is essential before rebuilding is that of the outlay which will be required. And here it may be stated positively, on the experience of many buildings erected during the last fifteen years, that there is no insurmountable financial difficulty. The rental received from the labourer will pay a fair percentage upon the outlay necessary to provide him with the amount of accommodation to which he is accustomed. The first cost of building labourers' dwellings in blocks in London may be taken at between 7*d.* and 8*d.* per cube foot for all expenses except land, and the cost per room, including share of staircase, laundry, sanitary arrangements, &c., would be a little under 60*l.* The rooms can be let at an average of 2*s.* 9*d.* per week. We have then the following estimate of outlay, and of annual receipts and expenditure per room. The first cost, exclusive of land, is, as above stated, 60*l.* The annual receipts will be 7*l.* 3*s.*, allowance being made for repairs and loss of rent by vacant rooms in the estimate for annual expenditure, which will consist of these five items:—

1. Dividend on first outlay, at 5 per cent.	£3	0	0
2. Rates, taxes, and insurance, 25 per cent. on net receipts	1	10	9
3. Collections at 5 per cent. on net receipts	0	6	3
4. Ground rent	0	18	6
5. Balance for repairs and loss of rent	1	8	0
	£7	3	0

The form of the building being necessarily a block, the grouping of the rooms, the access to them, and the sanitary and other arrangements have to be considered. While a certain number of single rooms are provided, it is by no means intended that families should continue to live in one room, unless absolutely compelled to do so by lack of means. Many are now living in one room that could and ought to occupy two or three. The rooms should therefore be so grouped together, and connected by entrances that, while they are independent of each other, and can be let singly to separate families, they can also, without any alteration, be let in pairs, or three or four together. A certain proportion of two-roomed tenements should be provided. When the necessary height has been given to a room, the larger the floor space that can be secured the better. If a room is to be 12 feet × 12 feet × 8 feet 6 inches, it is better

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to make the floor 12 feet × 12 feet than 12 feet × 8 feet 6 inches, the cubic content being the same in both cases.

The single-room tenement should contain a good and strong cooking range, with oven, but without boiler, a coal locker so arranged as to serve for a seat, and a cupboard to contain food and crockery. In planning the room a comfortable corner should be reserved for the bed, with which neither window, door, nor fireplace must interfere. A broad window-sill for window gardening is desirable, and the door of each single-room tenement should open to the external air to avoid the possibility of infection being conveyed from room to room. The balcony offers an advantageous mode of access to the one-room tenement, and should be reached by a broad stone staircase, open to the air. The staircase is apt to present great difficulties in management if not very carefully considered. One of the great objections to converting an ordinary house into a tenement house is that the front door, being left open at night to suit the late hours of some of the tenants, the staircase becomes accessible to tramps and others. They enter the passages and sleep on the stairs of these houses, and by their vile behaviour contribute greatly to degrade the inhabitants. If the staircase is of stone, open to the air and rain, well lighted both by day and night, and overlooked by the superintendent's rooms, it cannot thus be misused. No other kind of staircase is admissible, and the fewer of these the better for cleaning and management, it being better to increase the size than the number. Outside the one-room tenement, and at a little distance from it on the same floor, or on the half-landing above or below, should be the pail service, where water can be drawn not from a cistern where it has been standing for days, but direct from the main. A sink-stone in the floor will take any water spilt in drawing, and will also take the waste water which it is important should be emptied away over a sink-stone, and should pass through small perforations before entering the drain, so as to separate from it the flannels, soap, scrubbing-brushes, and other things left forgotten in the pail, and sometimes when precautions are omitted introduced with disastrous effect into the drain. The arrangements connected with the water supply and drainage are by far the most difficult to manage, and give more trouble than any other. This trouble is increased by the regulations of the water companies, whose waste-preventing arrangements are frequently waste-producers from their liability to get out of order. The screw-down valve is a fruitful source of waste, as people will not take the time and trouble to close it completely. In the common laundry, the use of a copper for part of a day each week is assigned to each tenant of a single room, who also has access to a drying ground, upon the flat roof of the block. Separate sanitary arrangements cannot be given to each single-room tenement, but are assigned to every two or three tenements, and are kept under lock and key. The simpler and stronger these arrangements are the better. Iron traps and iron pipes, jointed with red lead, are found to answer best. Lead is quite inadmissible, being easily damaged or stolen, besides being more costly. The drainage should be by glazed stoneware pipes, laid in straight lines and with good fall, manholes being substituted for bends and junctions, and ample means of examination and clearing being provided. Thorough ventilation of the drains and their complete isolation from the sewer is of course essential. A large dust-shoot, with an opening on each floor, should receive the ashes and refuse. Ventilating appliances must be provided to each room, and should be out of sight, or they will certainly be stuffed up and closed. An inlet for fresh air, without draught, can often be made over the architrave of the door. A small slot-hole, cut in the meeting-rails of the window sashes, is inexpensive and very useful, as it gives an upward current of air without draught, and imperceptibly changes the air of the room. It is also not easy to close up.

Repairs require a large expenditure when old tenement houses have to be maintained and managed. This arises from two causes. One that the labourer and his family are not very careful of their dwelling, the other that old tenement houses are often all but falling to pieces. The labourer is rough and strong, and requires surroundings not easily damaged. He usually knows good work when he sees it, and he despises, and is therefore not careful of the miserable building in which he is compelled to live. Besides this, the materials, even if good, and the mode of construction of an ordinary dwelling-house, even before it has become so old as to have descended to the condition of a tenement house, are unsuitable in the highest degree. For instance, instead of the rooms being enclosed by brick walls able to resist a considerable amount of wear and tear without injury, the rooms in which the labourer and his family are usually lodged are enclosed with lath and plaster. This, when new, is very tender and easily damaged; but when in the state in which we usually find it, having lost its precarious hold upon the slight laths, it is only held together by the layers of paper with which the walls are covered. The least touch causes this plaster to fall, and when once a hole is broken into it, the damage spreads with great rapidity, and in repairing it it is difficult to know where to stop. Not only are the walls and ceiling in a condition very liable to damage, even when most carefully used, but the floor is usually worn so very thin in places that the legs of the furniture, and even the feet of the family, unexpectedly break through. Every other part of the room, the door, the window, and the fireplace, has long ago been worn out, and should have been replaced. Gradually all parts of the building, except the foundations and the lower parts of the wall, have to be renewed. This process of rebuilding, bit by bit, is misnamed repair, and is supposed to be due to the destructiveness of the labourer. The fact is that the labourer is compelled, by necessity, to live in a house which is in such a state of decay that every other tenant has left it. His house is dilapidated, not because he has destroyed it, but because he cannot find a house to live in which is not in a state of dilapidation, and cannot compel his landlord to repair it. Vigorous action on the part of the sanitary authorities might easily prevent this. They have hitherto been far too chary in condemning premises unfit for human habitation.

It is not proposed to supersede the regular collector, where he can deal satisfactorily with the tenants, as he probably can with the superior artisan. But at present a large proportion of tenement house property is in the hands of landlords very slightly removed from the class inhabiting it, and these landlords usually collect their own rents. The collector or agent is only called in when the property belongs to persons of a higher grade, and

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when the landlord is practically an absentee. It is, therefore, of great importance to train and employ collectors of education and intelligence, who can be trusted to recommend cases for relief, and who can distinguish genuine distress from that which arises from idleness and vice. The hold on the tenants is immensely increased by the knowledge that help is forthcoming in time of need; also by shutting up other channels of relief, and by allowing it only to come through those best acquainted with the recipient, mendicancy and pauperism are much reduced. The collector receives the ordinary percentage paid for collecting rents. In addition to the collector there is a resident superintendent, who is by preference a retired policeman, soldier, or sailor. His duty is to keep order, to report any breach of rules, to see that the premises are kept clean, that the gas, water supply, and drainage are in proper order. Usually he is able to do some of the repairs himself; and, having a pension or some means of his own, is glad to superintend in exchange for having his rooms free.

Into the entomology of tenement houses it is not proposed at present to enter. The subject is, however, both important and extensive, as those have reason to know who have seen tenement houses pulled down.

In new tenement buildings care is taken to use materials not easily damaged. Lath and plaster partitions are avoided, and brick walls are substituted for them. Iron balusters and stone steps supply the place of wood, and being incombustible, are not torn up for firewood. Everything being well chosen for its purpose, strong, and not in a state of decay, the damage of ordinary use is small, even with the labourer as tenant. Of course, whitewashing, colouring, and occasional painting have to be done, but very few other repairs ought to be required for many years, if in the first instance the buildings have been well constructed. There is no ground, therefore, to fear that the excessive amount of repairs needed in old tenement houses will also be required in new buildings.

We have heard a good deal about benevolence in connection with the subject of housing the poor; and, no doubt, those who have been longest at work in this department commenced it from motives of the purest benevolence. But has it not now outgrown this earlier stage, and having demonstrated that it has a sound financial basis, has it not passed into another phase which fits it for larger adoption than if it were simply a work of charity. It is, of course, not to be looked at only from what may be called the stockbroking point of view, and merely as a means of getting so much annual income from so much capital laid out. It will bear the closest examination in this aspect, but there are other and important sides to the subject. It is akin both to legislation and education. Those undertaking the management of the poor have to make regulations for them, and have to see that their laws are obeyed. They have to educate their tenants in habits of order, decency, frugality, and self-respect. We do not talk of the benevolence of a member of Parliament who spends the night in legislating for the benefit of the nation, or of the benevolence of the School Board member who passes weary hours in debating the difficult questions inseparable from education. The same faculties of organisation of Government, and of instruction, will find a humbler, though an important, field for their exercise in making laws for, and in superintending communities of the working class.

If benevolence is really necessary in order that the labourer may be properly housed, is it not clear that he is being deprived of the fair share of the value of his labour by those above him, since, with all his exertions, he has to fall back on benevolence for several of the necessaries of life.

Superintendence is an essential element of success in housing the labourer. Without it, the rebuilt or repaired court would at once be as bad as ever. The present condition of the poor is the result of a let-alone policy, which leaves the lower working class to the mercy of the speculator, whose only consideration is how to get the most out of him with the least expenditure of time, trouble, and money. Without superintendence every kind of disorder will prevail; buildings will be damaged, rents unpaid, and any attempt to improve the condition of the tenant must fail. The work of re-housing the poor must be gradual, and cannot be done suddenly or wholesale. Experience must be acquired, and the discoveries already made must be acted upon, and the successes followed up. If the managing and superintending elements are outrun by the acquisition or building of dwellings, no success can be attained. A block of so-called model dwellings in the east of London is a lamentable instance of this. Built for a company without regard to the wants of the neighbourhood in which single-room tenements were needed, the sets of rooms did not let because they were too highly rented, and provided too much accommodation. In consequence the company failed, and the building came back into the hands of the builder, who let the rooms to any one who chose to pay the rent. There was no efficient superintendence, and the consequence was that the condition of the tenants was as bad as that of any we have had described of late. Now the sanitary authorities are interfering and compelling certain necessary changes. This block of dwellings furnishes a most instructive comment on the necessity of efficient superintendence.

In conclusion, there is no need to wait for further legislation to facilitate the housing of the poor, nor for some great commercial association to take the matter in hand. The work will be done, if ever it is done at all, by those interested in the well-being of the labouring class; it will be done gradually, and will grow out of what has already been successfully accomplished. As a first step the capitalist will purchase the dwellings and the land on which they stand. Even if the movement stopped here, it would be an immense gain to the labourer to have a landlord interested in his welfare rather than in the amount of rent which could be wrung from him. Land suitable for dwellings will also be secured. By the activity of the sanitary and local authorities unsound habitations will be condemned and destroyed, and will not then fetch the fancy prices often realised for property of this class. Those who have leisure will associate themselves with the existing agencies, will learn the secret of their success, and will be preparing to take charge of a small community of labourers when the opportunity arises. Others will assist by supporting the authorities and urging on them the administration of the existing laws against nuisances, overcrowding, facilities for intemperance and vice; they will call attention to dangerous structures, defective drainage, and water supply. All will assist by making friends with those

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of the labouring class to whom they have readiest access, and who will be found, despite their lack of many of the essentials to their well-being, to be far less unlike those who have all these advantages than want of acquaintance with their good qualities would lead many to suppose.

REMARKS ON THE EXAMINATION OF WATER FOR SANITARY PURPOSES.

By CHARLES E. CASSAL, F.I.C., F.C.S.,

Demonstrator, Department of Hygiene, University College, London.

and B. A. WHITELEGGE, M.D., B.Sc.

(*Continued from page* 429.)

WITH regard to the second point above-mentioned, viz. that discrepant results are obtained when samples containing known quantities of polluting material are submitted to analysis, we have to consider Dr. Robert Cory's extremely able and interesting report of an extensive series of experiments carried out by him with a view of testing the validity and sanitary value of the various methods of water-analysis.*

Desiring to find whether analysis really gave results proportional to the amount of impurity present, Dr. Cory prepared samples by adding known quantities of various organic substances, such as enteric stools, healthy stools, urine, and egg-albumen, to waters, and submitted these to analysis. Dr. Cory made use of Lambeth water to make up his polluted samples. He added the measured quantities of the various polluting materials, and took note of the amounts of albuminoid ammonia, &c., obtained over and above the amounts present in the Lambeth water itself; that is he drew his conclusions in part from the *increments* obtained. The results were in many cases very fairly proportional to the degree of pollution, more especially in the case of the albuminoid ammonias, but in many there were serious discrepancies, sufficient at first sight to throw grave doubt upon the reliability of our present modes of analysis. The following analyses performed by Dr. Dupré are taken from Dr. Cory's report. We quote experiments in which egg-albumen was used for reasons shortly to be stated.

Dr. Cory's general conclusions as to the value of the Wanklyn and Frankland processes are as follows:—

'With regard to the albuminoid ammonia process of Messrs. Wanklyn and Chapman:

'(*a*) This may be trusted to show which of two samples of water is the more polluted when the polluting material contained in each is of the same kind; also, in that case, and when the absolute amount of polluting material is not great, it is capable of determining the relative degree of pollution in a number of samples.

'(*b*) But when the polluting material is in large absolute quantities a given difference in the extent of pollution is not indicated by a corresponding difference in the yield of albuminoid ammonia.

'(*c*) Equal amounts of albuminoid ammonia may be furnished by extremely different quantities of nitrogenous polluting material; and, conversely, extremely different quantities of albuminoid ammonia may be furnished by one and the same quantity of nitrogenous polluting material; and this is the case even though the polluting substances differ no more *inter se* than one typhoid stool differs from another typhoid stool. When a typhoid stool is compared with a healthy stool, obtained under somewhat similar conditions of diet, water polluted with the healthy stool yields to this process a larger amount of albuminoid ammonia than water polluted with the same quantity of typhoid stool.

'(*d*) The classification of waters, given by Messrs. Wanklyn and Chapman in their work on Water Analysis, is calculated to mislead in a very dangerous way. "Drinking water," it is there stated, "falls into three classes according to the degree of organic purity;" and Class 1 comprises "Water of extraordinary organic purity, yielding from ·00 up to ·05 parts of albuminoid ammonia per million." "Water of this class cannot be objected to organically." Yet the pollution of a gallon of water by all the soluble and finer particulate matter from 3·5 grains of typhoid stool, is represented in Mr. Wanklyn's own hands by no greater increment than

Name of Sample.	DD Lambeth Water from Cab Rank, Wesminster Bridge Road, Feb. 4, 1881.	EE 2,000 c.c. of Distilled Water, to which had been added 2 c.c. of egg-albumen. Pollution=10·15 grains of dried egg-albumen per gallon.	FF 2,000 c.c. of Lambeth Water of Feb. 4, to which added 2 c.c. of egg-albumen. Pollution=10·15 grains of dried egg-albumen per gallon.
Appearance	Clear	Turbid	Turbid
Colour	Brownish	Very pale brownish	Brownish
Deposit	None	Little, white flocculent	Little, white flocculent
Nitrous Acid	None	None	None
Phosphoric Acid	Much	Very strong trace	Very strong trace
Colour of Residue	Light brownish	White	Light brownish
Behaviour of Residue on heating	Blackens slightly	Much carbon separated, strong smell of burning nitrogenous matter	Much carbon separated, strong smell of burning nitrogenous matter
	Grains per gallon.		
	DD	EE	FF
Oxygen absorbed from permanganate	0·134	0·731	0·901
Total dry residue	20·10	10·92	29·4
Consisting of volatile salts	3·36	9 8	11·48
" fixed salts	16·8	1·12	17·92
Chlorine	1·02	0·14	1·16
Nitric acid	0·26	none	0·06
Ammonia	0·0000	0·0224	0·0101
Albuminoid ammonia	0·0112	0·597	0·6387

* Eleventh Annual Report of the Local Government Board, 1881–82.

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·02 parts of albuminoid ammonia per million of water.'

As regards the process for determining organic carbon and organic nitrogen, Dr. Cory seems to be of opinion that it achieves what it professes to achieve rather more satisfactorily than is the case with the other processes. He says (p. 158), 'It would not be wise to generalise much from the results of two analyses, but having regard to the intentions of the method, it is probably permissible to form a judgment on it without any great variety of experiments; and the impression conveyed to me by the results of these processes for the determination of organic carbon and organic nitrogen is to prefer them to the processes which aim at bringing into simpler combinations the various elements of organic substances, and at deducing the quantities of these substances from the quantity actual or inferred, of those combinations.'

Some of the analytical results in Dr. Cory's report seemed so much at variance with the generally held opinions as to the merits of water analysis, and with previously published results by Mr. Wanklyn and others, that we were led to examine the details of the experiments and more particularly as regards the Wanklyn process, which is chiefly dealt with in his report. All previous evidence seemed to be in favour of accuracy. It is well known that very exact and concordant results are usually obtained by different analysts in examining the same water, and that repeated examinations of the same water are also very constant, the periodical examinations of the London drinking waters furnishing an example. Moreover, Mr. Wanklyn's results in his experiments with different nitrogenised bodies treated by the alkaline permanganate process, are most satisfactory. There is further Dr. Fox's evidence, previously referred to, as to the concordance of opinion based on independent analyses made by both the Wanklyn and Frankland processes.

If the polluting agent is *uniform in composition*, and uniform in diffusion, if the reagents are standardised and in proper proportional quantity, and if the same treatment is applied in all cases, then it seems obvious that, whatever portion of the polluent in one case is acted upon by the reagent, an exactly proportional part of the same polluent in another case will be acted upon in the same way and to the same extent.

In some of these experiments this does not seem to have been the case, and it remains to be seen if the failures were due to absence of some of the essential conditions, or to radical imperfections in the methods of analysis. The amounts of ammonia obtained were in some cases small, but this does not affect the question, inasmuch as the object in view in most of these experiments was to test the process as regards its capability of yielding results proportionate to the amount of pollution.

As regards the polluting substance it is to be remarked that only a small portion of the enteric stool, for instance, is *solid matter*; only a part of this solid matter is nitrogenised, and only a part of the nitrogen present may come off as the ammonia which, in the Wanklyn process, forms our index of pollution. The ammonia yielded is not an absolute measure of the bulk or weight of the polluting ingredient, nor of the solid matter in it, nor of the injurious and dangerous properties of such matter, but simply a *measure* of the nitrogen present in organic combination, and hence of the pollution. It does not profess to tell us the absolute amount of the nitrogenised matter, nor even the amount of the nitrogen in organic combination, as is the case with the combustion process; but we venture to maintain that it does present a constant proportion for varying quantities of the same polluent.

We may here quote the following passage from one of Mr. Wanklyn's essays on the subject.

'Acetic ether may be made to yield acetic acid quite quantitatively, and in whatever sense the carbon contained by acetic ether can be said to be a measure or index to the acetic ether, in the same sense the acetic acid is a measure or index to the acetic ether. An unknown mixture of acetates could not be absolutely measured by the carbon it contains, neither could the mixture be absolutely measured by the acetic acid which it gives. But in whatever sense the carbon can be said to be an approximate measure of the mixed acetates, in that same sense is the acetic acid a measure. For acetic acid read albuminoid ammonia, for acetic ether read albuminous substances, and for mixed acetates read the miscellaneous nitrogenous organic matters in drinking-water, and the parallel is complete.'

The process is designed to determine whether a water is or is not passable, acting upon a standard based on experience. The limit generally admitted in the case of albuminoid ammonia is 0·15 parts per million, and a water which yields anything approaching this amount is to be looked upon with very great suspicion. This limit was fixed upon after a long series of experiments as representing the maximum yield of albuminoid ammonia in waters which were known to be uncontaminated. A limit of some kind, determined in a similar way, must of course be used in any process. If, therefore, we find more than ·15 parts per million of albuminoid ammonia, we conclude that there has most probably been organic pollution; and as this may be, or may at any time become, dangerous, we condemn the water. And it may be further stated, as an almost invariable rule, that other analytical evidence will be found to confirm this conclusion. It is true that in some rare cases a water fit to drink may yield more than ·15 per million of albuminoid ammonia, and that other analytical results are negative; but the condemning of such water occasionally is of immeasurably smaller importance than the passing of a single one that is impure. If we find, on the other hand, less than ·10 parts per million of albuminoid ammonia, it is reasonable, other evidence: o the contrary being absent, to conclude that the water is unpolluted; inasmuch as, for such a water to be polluted, it is necessary to assume, firstly, that it was originally of very exceptional purity, and secondly, that the pollution had taken place to an extent far slighter than occurs in almost every case where there has been any pollution at all.

It is hardly fair in dealing with quantities widely differing from those generally met with (for which the process is devised) to expect very close agreement of results, just as it would be unreasonable to expect a chemical balance to weigh pounds or fractions of milligrammes with as much accuracy as it weighs grammes and decigrammes. Further, a process which is capable of differentiating with accuracy between say two and three parts—whatever unit be taken—must not be considered as invalid if it fails to distinguish equally sharply between 52 and 53. An error of 1 would in the first case be fatal, amount-

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ing to 30 or 50 per cent.; whereas in the other it would be an error of only 2 per cent. We must therefore not expect to measure minute *increments* in presence of a large quantity (even if accurately known) of other impurity, which also yields the same measuring product.

Passing now to the consideration of Dr. Cory's experiments, it seems to us that some of the above remarks apply with a certain amount of force. Fæcal matter is the first material used. In some of the experiments its amount was determined by *weighing* a known quantity in its normal state and polluting water with it. Here we have evidently no guarantee of uniformity. This difficulty being at once obvious, in another case the total solid constituents of the fæcal matter were determined; and in yet another the amount of soluble constituents, because the water for analysis was only taken after it had been allowed to stand and deposit suspended matter. We are not told that a separate determination was made in each case, but doubtless this obvious precaution was observed, as there is no ground for assuming constancy of composition between different stools, or even constancy of composition in *the same stool.* The polluted water having been allowed to stand and the deposit ignored, and the more or less clear supernatant liquid analysed, it is scarcely possible that it would have had any very constant composition; at all events, not in relation to the original weight of polluent added. And as the object of the experiments is to find whether the results are proportionate to the impurity present when equally diffused, not to determine if the water is or is not polluted, there seems little to be gained by using a polluent so difficult, if not impossible, to diffuse uniformly, although it has, of course, the advantage of being a most common and dangerous source of contamination.

We next come to urine, obviously far better as regards diffusion. The nitrogen is present in urine chiefly in the form of urea, which is with the greatest ease converted into carbonate of ammonia. In the case of urea, Mr. Wanklyn points out that no free or albuminoid ammonia is obtainable, urea being in a sense a completely oxidised body. If the urea be decomposed into carbonate of ammonia, we should of course obtain the nitrogen as 'free' ammonia. On p. 135 of Dr. Cory's report we find that 3·094 grains per gallon of urea in Trafalgar Square water gave no increment to the total dry solids, although it did so in distilled water. Doubtless this had ceased to be urea, by the action of the ferments in the dirty water used.*

The results with urea depend upon the water to which it was added; this, if dirty, will cause the more or less rapid transformation into ammonic carbonate. In actual practice, where we have urine-pollution, this transformation has already taken place. The impurity is no longer urea, and we obtain a large amount of 'free' ammonia. Here again, then, the conditions were scarcely well chosen. If the proportional result is to be obtained from urea as urea, we must not use impure waters, and must look for only minute traces of ammonia from it; and while it is in process of rapid change to carbonate of ammonia it would be vain to expect uniformity of composition or uniformity of result.

* As the 'free' ammonia was not high, and the albuminoid ammonia was very high, it follows that the urea had not become ammonic carbonate, but had passed into some condition in which it yielded albuminoid ammonia. There seems to be some error here.

With egg-albumen many of these criticisms lose whatever force they may be thought to have in the preceding cases. If the albumen is uniformly mixed with water and well filtered, we have a fairly constant diffusion *for the time being.* We have found, however, that even after repeated filtration such mixtures are opalescent, and that diffusion is by no means perfect. Where Dr. Cory has used albumen his results are, as a rule, also fairly satisfactory as regards the albuminoid ammonia. We deemed it advisable to make a few experiments with albumen solutions. The fact is first to be noted that the albumen solutions change, and that very rapidly—if allowed to stand they lose weight by evaporation, become turbid, and decompose—but albumen seems, nevertheless, to be the most suitable of the materials used by Dr. Cory. Great care was required to overcome the liability to error from coagulation of the albumen and its consequent adherence to the sides of the distilling flask. This, by the bye, does not, in our experience, seem to occur in ordinary water analysis, *i.e.* the albuminous matter even in the very worst waters, *e.g.* in effluents from sewage, does not behave in a similar way. Some of the results we have obtained with albumen solutions are as follows:—

Sample A.

2 c.c. egg-albumen solution + distilled water, free from ammonia to half litre.

Albuminoid ammonia, 0·756.

Sample B.

4 c.c. same albumen solution + distilled water, free from ammonia to half litre.

Albuminoid ammonia, 1·47.

In these cases the pollution was obviously very large.

Sample C.

1 c.c. egg-albumen solution + distilled water, free from ammonia to half litre.

Albuminoid ammonia, 0·294.

Sample D.

0·5 c.c. egg-albumen solution + distilled water, free from ammonia to half litre.

Albuminoid ammonia, 0·156.

Sample E.

2·5 c.c. albumen solution + distilled water, free from ammonia to half litre.

Albuminoid ammonia, 0·338.

Sample F.

5·0 c.c. albumen solution + distilled water, free from ammonia to half litre.

Albuminoid ammonia, 0·662.

(Results stated in parts per million.)

The albumen solutions were different in each of these three sets of comparative experiments, and were all more or less decomposed. The other results we have obtained we propose to lay before the society on a subsequent occasion.

It will be seen that the figures are in no case far wide of the actual proportions present, which, we may add, were in all cases unknown to the analyst. It has always been our experience in working the ammonia process that whenever it has been necessary or advisable to analyse the same sample two or more times—a thing which very often occurs—having either the same or different quantities of the samples for the repeated experiments, the amounts of ammonia obtained have been equal when equal quantities were taken, and proportional when the quantities were different.

How is it, then, that in some of Dr. Cory's albumen experiments the results obtained show

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serious discrepancies? We would suggest that the explanation probably is that the quantities to be measured were often widely different from those occurring in ordinary waters, and that they were determined in an impure water which itself yielded a large quantity of albuminoid ammonia on analysis, and, in the case of the earlier experiments, uncertainty as to the proportional pollution.

So far as the evidence before us goes, there seems to be no good reason to doubt that we can and do thus obtain valid evidence of the degree of impurity of water.

As regards the cultivation processes, which are somewhat prematurely credited with the capability of altogether supplementing present methods of analysis, it is well known that practically all waters are found to contain organisms, the commonest of which are the easiest of cultivation. It is asserted that by a cultivation process carried on in a 5 per cent. solution of previously sterilised gelatine, or other nutrient substance, the presence of sewage can be demonstrated by the differences in the naked-eye characters of the spheres which form in the matrix. But even if this be so, it merely forms an additional test for the detection of sewage—a detection which is already satisfactorily effected by other processes; and it cannot, therefore, supersede these unless it can be shown to afford a means of distinguishing between specific and comparatively harmless organisms. Whatever future success there may be in store for the cultivation processes, at present they can tell us absolutely nothing of the presence or absence of specific organisms or specific poisons of any kind.

Dr. Cory concludes the report to which we have referred by the statement, previously quoted, that he prefers the Frankland or combustion process; and he considers that, 'having regard to the intentions of the method,' this preference is sufficiently justified by the results of two analyses made by it, which showed with a considerable degree of accuracy the amounts of polluting material which he had added to the waters, and the ratio of organic carbon to organic nitrogen, with a close approach to the truth.* But the results of the Frankland process yield no more information as to the dangerous character of the organic pollution than do the results of any other process. The distinction between animal and vegetable organic matter is made out with as much certainty by the ammonia process properly worked, and duly accompanied by other analytical evidence, as by a study of the ratio of organic carbon to organic nitrogen; and although as regards the Frankland process everybody must unquestionably admire the great ingenuity and skill which have been brought to bear in the development of that truly beautiful analytical method, yet the sanitarian has not much, if anything, to gain by making use of it. The conclusions arrived at are reached with equal certainty by far more easy and rapid means, and consequently one cannot help thinking, that a very large amount of scientific skill and labour is unnecessarily lost in using the process for sanitary purposes.

We contend that, as regards either evidence or criticism, nothing has as yet been brought forward that seriously minimises the enormous value of water analysis in sanitary science. Whether we 'go beyond the laboratory' or not, we shall arrive at no method of investigation whose results will justify us in speaking of a water as absolutely safe. Absolute safety is unknown and unknowable.

* We may point out that in Dr. Cory's urea experiments (p. 135 of the Report), 3·094 grains per gallon of urea yield no increment to the total solids when dissolved in Trafalgar Square water; so that the urea has been decomposed and dissipated. Inasmuch as the taking of a dry residue is the first step in the Frankland process, such a quantity of urea would, therefore, fail to be detected by it.

AN UNEMPLOYED FACTOR IN THE PREVENTION OF DISEASE.

By PAUL Q. KARKEEK, M.R.C.S., L.S.A.

Medical Officer of Health, Torquay and St. Mary Church.

As a medical practitioner, and especially as a medical officer of health, one sees so often and so much of the ignorance of the poor in matters relating to sickness and sanitation, that it becomes almost an urgent duty to seek some means to bring about a change. It must not be assumed that ignorance on these subjects is confined exclusively to the poor; but one certainly finds higher in the social scale a greater desire to learn, and the instructions of the medical man are generally more implicitly obeyed; this is perhaps due to easier circumstances.

Small-pox is now very rare, thanks to vaccination; but there was a time when it was nearly always in our midst, killing some and maiming others. Parents were then only too glad to have their children even inoculated, in the hope of protecting them; and thus when vaccination was introduced it was received on the whole very favourably, considering the inherent obstinacy and obstruction in human nature, because every one then could see for themselves this loathsome disease at its work, and note the consequences. But this has all been forgotten, or we should not to-day hear so much about anti-vaccination: those who talk loudest now, can know but little of the past.

But scarlatina and measles are still popularly supposed to be the birthright of all, an unhappy heritage like death and taxation, from which there is no escape: and consequently when an outbreak takes place, the poor fold their hands with oriental resignation, and say 'Kismet.' The mortality from these two diseases depends, not entirely, but to a great extent, first, on the type, whether mild or severe; and secondly, on the temperature and weather at the time. Should the type be severe, the parents see the danger and do their best; but, if mild, very little care is taken, the children are allowed to do as they like, which means being out of bed more or less dressed and playing about in draughty staircases, passages, and doorways. The doctor is seldom sent for to see these cases, except when things are going wrong; and if the clergyman or the district visitor warns the parents of the danger, the reply is: 'He is only a bit poorly'; or, 'Why should he stay in bed, he's able to eat and drink;' and thus it comes to pass that, even under favourable circumstances, so many children die after measles and scarlatina from acute lung and kidney mischief; but if the climatic influences are adverse, then even so much greater will be the mortality.

The infectious stage in scarlatina is principally during desquamation, or peeling; and here it is that the ignorance of the masses is so detrimental to the public health. Instead of keeping the children at home, they are sent out to play, or to school, and

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in every other way allowed to spread the disease among their playfellows. During the past summer an outbreak took place which I was able to trace distinctly to a Sunday-school treat, to which a child had been allowed to go in this infectious condition. I have known a woman bring a child peeling from head to foot all the way from York to Torquay, and thus cause the deaths of two children in the house she lodged: how many she helped to kill on the journey will never be known. It is needless to quote instances of this unfortunate practice; the medical profession and school managers are but too well acquainted with them. During an epidemic we distribute circulars broadcast, containing full details of what should be done, and how to do it. But very seldom is an attempt made to follow these instructions, and, if remonstrated with, one is met with, 'Some other child must have brought it to mine'; or, 'Why should it be kept in doors for a bit of peeling'; or even more likely, 'I don't hold with all this fuss and talk about infection." I have, indeed, known instances where a successful effort has been made, even under very adverse circumstances, to keep one child isolated from its brothers and sisters; but in such cases, the mother has perhaps years ago been a nurse in a good house; or, the father has served in the Royal Navy, and have then seen isolation practically carried out, and learned its value.

With the view to helping the poor as much as possible, supplies of oil for rubbing, and bottles of disinfectants are kept at the Town Hall, and which can be obtained by simply asking. These bottles have large red poison labels with instructions for using the contents on them; and for fear of accidents, the disinfectant used is always of a non-poisonous nature. A short time since a supply was given to a man for a case of scarlatina; and verbal, as well as printed instructions at the same time. The next day the man was asked if he had used them, and he replied: 'Oh, yes, sir, we took a dose all round, and gave one to the baby.' Fancy the result if the disinfectant fluid had been carbolic acid, or solution of chloride of lime!

Then, again, how often do we find the poor living in very unsanitary homes, with air polluted, water poisoned, and food tainted; and very often when a little trouble would change all. They are not careless of their lives, or of those of their children; they simply don't know, and can't comprehend the value of warnings when given. An instance of perverse ignorance in this respect was forcibly brought under my notice not long ago. The sanitary inspector had ordered a sink trap which went direct into the drain to be closed, and owing to the level of the ground was unable to place another inside the room, but had one constructed outside the door. Very shortly afterwards the wife made her husband dig out the cement from the old trap, because she would not take the trouble to go outside the door, a distance of eight or nine feet.

The town of Torquay has recently built, at great expense, a hospital for infectious diseases, a model and commodious structure; but great difficulties are found in getting it used by the very class it would mostly benefit. The poor will allow their children to go to the infirmary when bones are broken, or when an operation is necessary; but to let a child go to the sanitorium in order to prevent other children in the same house catching scarlet fever, is more than they can understand.

It is hard to learn while the struggle for daily bread is going on. When hearts are filled with anxieties and the petty worries of life, there is seldom much energy to take in any new lesson, or even mind enough to comprehend it, especially if the application of the doctrine involves a little trouble. With the present generation of mothers not much can be effected, but surely something might be done with the next.

Let us begin at the beginning. How many of us would learn the multiplication table, not to mention Latin grammar, if we were put to such work for the first time when forty years of age? We must begin with the children: it should be brought home to them when they are able to take it in, and they will easily learn in childhood that which in after life, with faculties dulled by cares and labour, they cannot understand, much less practise. I venture to suggest that in all schools under Government inspection the elder children should be regularly taught a course of simple lessons on the prominent symptoms of infectious diseases, the dangers to be expected, and how to avoid them; the ways in which infection is spread, and how to prevent it; the common defects in house sanitation, and how to detect them; with the pollution of air, food, and water, and the dangers of damp and overcrowding on the constitution. In short, a simple course of lessons on health, and how to keep it. This ought not to take very much time, for children easily learn technical lessons such as these would be. The subject should be a compulsory one, and if the school examiners were authorised to give good marks to the teachers whose children show proficiency in it, not much difficulty will be found in teaching it.

The tendency of the legislation of the day is to guard the public health; and wisely so, for to most of us health means everything. But Acts of Parliament are passed in vain if the public intellect cannot understand and does not appreciate them. We endeavour by education to raise the intellectual standard of the people, and thus hope to prevent poverty and crime: and there is a growing impression, not without foundation, that a great deal of crime, not to mention lunacy, is due to ill-health. That is, the mind is influenced in childhood by disease and unhealthy surroundings, and consequently the individual has not a fair chance in the battle of life. The oft-quoted line of Juvenal, 'Mens sana in corpore sano,' aptly expresses this feeling; and in reality this should be the end and aim of all education. At present we content ourselves with developing the minds, but we might go farther with advantage, and teach the children how to take care of their bodies, and thus guard the greatest of all gifts—health.

SWEDISH GYMNASTICS.—At the suggestion of Captain R. H. Armit, Central London Rangers, the London School Board have decided to adopt the Ling (Swedish) system of calisthenics in all their schools under the head of 'physical training.'

THE INSPECTION OF DAIRIES AND MILKSHOPS.—The Council of the Social Science Association have, in view of the spread of zymotic diseases through the milk supply, presented a petition to Parliament and memorials to Her Majesty's Privy Council and the Local Government Board, praying for the introduction of a Bill to transfer the duty of regulating and inspecting dairies and milkshops from the veterinary authorities to the local sanitary authorities.

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reflect on the amount of suffering and disease which must have been endured by the inmates of this

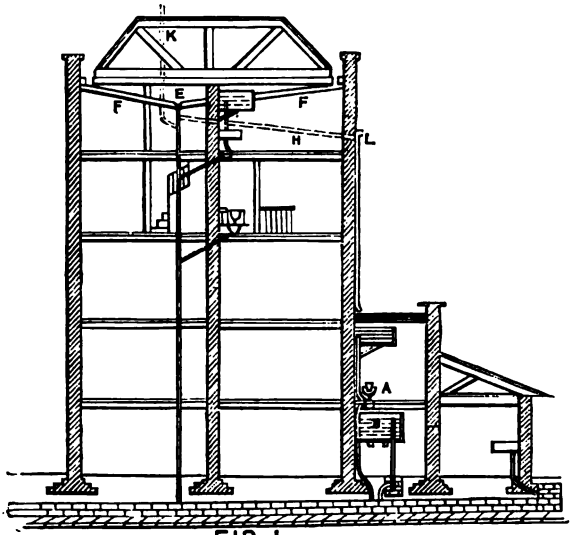

FIG. 1.

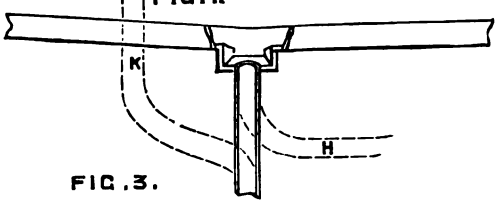

FIG. 3.

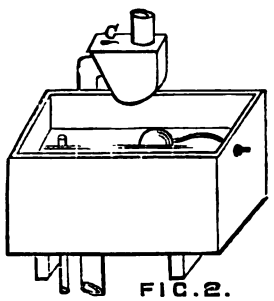

FIG. 2.

dwelling during the last fifty or sixty years. Disease and suffering there must have been, though, *mirabile dictu*, the 'maids enjoyed most excellent health' at the time when my inspection was made.

The remedies, as will be seen from the drawings, were very simple. The drain was trapped and disconnected from the main sewer, the soil-pipes were ventilated, and the sink wastes and cistern overflows were made to discharge over gullies in the open air. The closet on the ground floor was removed to a point where it no longer commanded the cistern of drinking-water, and a new soil-pipe was provided so as to pass clear of the cistern altogether. The defective arrangements of the open soil-pipe and the rain-water channels were got over by continuing the soil-pipe up through the roof, as shown at I and K, figs. 1 and 3, for the purpose of ventilation and diverting the rain-water by means of a pipe, H H, figs. 1 and 3, carried across out of the bedrooms and discharged over a rain-water head, L, fig. 1, attached to the exterior of the back wall.

HINTS TO SANITARY INSPECTORS.

(*Continued from page* 390.)

CHAPTER IV.—(*Continued.*)

FAULTS OF DRAINAGE IN HOUSES.

§ 36. *Sewers.*

THE sanitary inspector is expected to be acquainted with the workings of the various sewers in his district, and, should he discover anything wrong, any obstruction, or any fault in the pipes, &c., it is his duty to notify the same, to consult the surveyor of his parish, and to lay the facts before him. Nevertheless he may be able to suggest, in conjunction with the surveyor or otherwise, sundry remedial measures. It is not the province of these papers to enter into the construction, distribution, or management of sewers, because these matters appertain to the duties of the surveyor, who is entrusted with the sewerage of the district, and answerable for its proper working.

The gradients of sewers, and their freedom from silting up, as well as the working of any flap-traps between the house drain and the sewer, should be carefully explored by the inspector when he is called upon to examine them. As a rule, the character of the outfall of the sewers will not come within his province; but he would do well, nevertheless, to make himself generally acquainted with the subject.

§ 37. *House Drains.*

The proper working of a house drain depends upon the level at which it is laid, and the velocity of the sewage running through it. A fall of from one in forty should generally be aimed at, but it cannot always be provided for. The common rule is to give the house drain a regular fall to the sewer, allowing for a little extra fall in the open channel of the disconnection chamber, where the fresh air inlet is provided, and to take advantage of all the 'fall' that can be obtained.

It is far too common to find house drains laid down too deeply at the far end of the basement, whereby the whole of the house drain is crippled in its gradient. It will often be found that the drain can be sufficiently improved by relaying and keeping the farthest end well up to the lowest side of the floor, but sufficiently low, however, to allow of its being covered with concrete.

The greatest mistake is generally made in making choice of too large a drain-pipe inside the house. Very frequently 12-inch pipes are laid down when 6-inch would suffice, and 6-inch tributary pipes when 4-inch pipes would have been ample. The inspector should have a knowledge of the rules which regulate the sizes of drain-pipes. It may be taken as a safe rule that a 6 inch drain-pipe is quite sufficient to drain a town-house under ordinary circumstances, whereas a 4-inch pipe will suffice for the drainage of cottages. It is now common to lay down iron drain-piping in place of earthenware pipes, and sometimes to fix the former above ground. This practice must commend itself to all who have studied the subject; but it must not be supposed that properly laid glazed earthenware pipes cannot be laid so as to satisfy healthy conditions.

§ 38. *Testing House Drains.*

The tests for underground drainage are few in number, but sufficiently satisfactory as far as they

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go. Should the inspector believe that a drain is badly jointed, he should charge it full of water between point and point. If no water is lost after standing for an hour or so, he may safely assume that the drain is watertight. If the water escapes, it will therefore do so outside of the pipe, with a risk of fouling the subsoil, and it may even happen that the liquid may escape between the exterior of the drain-pipe and any concrete surrounding. The bottom of the house drain may be sound, and the upper portion of the pipe's circumference be open. This is especially the case when the pipes have been improperly luted with clay, instead of with cement.

All properly laid house drains are laid down in straight lines, as much as possible without curves, and at every departure from the straight line inspection manholes are formed, so as to permit of the state of the drain being examined at a moment's notice.

Assuming the underground drain of the house to be in perfect order in every respect, it may nevertheless happen that the jointing of the upright piping of the horizontal drain may be faulty. In this case it is a good practice to burn some sulphur upon a pan covered with live cinders in the air-chamber, and then to close the manhole cover. This is a crucial test; because should there be any faulty connections in the upright pipes, which unfortunately must traverse the inside walls of a row of houses, then the faulty place can be instantly discovered by sense of smell.

Another test, under the same conditions of pipe-fixing, is what is called the 'smoke test;' and the treatment is the same—viz., by burning suitable brown paper in the chamber, and trying for the pungent smell emitted, wherever the pipes have been taken up inside the house. This test has the additional advantage of proving to the inspector whether or not there is a clear way of ventilation in the drainage of the house, inasmuch as he ought to see the smoke issuing from the tops of the ventilating pipes which are placed on the roof-top.

Another somewhat different test is known as the 'peppermint test.' In this case the operator goes to the roof of the house, and pours down—say an ounce of peppermint, and afterwards a gallon or two of warm water. He then closes the top of the ventilating pipe, taking care that should there be more than one ventilating pipe the whole of them are closed. Should there be any fault in the pipes, or should the traps leak or be unsyphoned, the volatile oil would make itself felt in the neighbourhood of such a fault, and can be remedied accordingly. The person operating should be very careful not to open the phial of the oil of peppermint except when on the roof-top, and should stay there until the testing has been completed, as otherwise he will carry the scent with him in his descent through the house, and frustrate the objects of the examination.

§ 39. *The Testing of Gas-Pipes.*

It has often happened that the smell of escaping gas has been taken for escaping drain-gases, and has caused much unnecessary expense. Where the escape is small, the smell simulates the foul odour of drains very closely. Under these circumstances, the gas-piping should be carefully examined, and this can be done by any competent gas-fitter by the ordinary test of smell after he has exposed the pipes, especially in a small house.

In a large residence with a great quantity of gas-piping and numerous burners, the only sound method of discovering the absence or presence of any leak, and in the latter case of its whereabouts, is by making use of the test practised by Mr. Eassie, C.E., and described by him in the *Times* of October 21, 1875. It runs as follows:—'Every burner save one is plugged up, and to that is attached a tube, in connection with an air-pump and gauge. If, after working the pump, the gauge shows no sign of sinking, the pipes may be taken as perfect, but if the mercury falls, there is certainly a leak, or leaks, and their whereabouts is discoverable by pouring a little ether into the tube and recommencing pumping.'

§ 40. *Escapes of Smoke into Rooms.*

It is equally common to find the smell of spent smoke issuing into the air of rooms, and to find that, owing to want of knowledge, the drains have been taken up, the soil-pipe and other casings taken down, without in the least relieving the occupants from the smell complained of. Nothing can be more offensive than the smell of spent smoke, or less easy to diagnose and separate from escaping drain-gas. This disagreeable smell generally makes itself manifest at the sides of the mantelpiece, due to a faulty setting of the grate. Too often, however, the smoke escapes through cracks in the brickwork, owing to the perishing of the parging, in the interior of the flues, and the consequent escape of the smoke between the joints of the brickwork. To make certain that smoke thus escapes, the proper thing to do is to strip the wall at the sides and front of the chimney breast, and should any cracks with black edgings be visible, then the mischief has been laid bare. The cure for the nuisance is to send a sweep up the flue, in the ordinary way, and to fill up the cracks with cement. There are plenty of contracting sweeps who make a point of executing such work. As a matter of course, all this sort of thing could have been avoided had the flues been constructed with earthenware pipes laid inside the flue-spaces in the first instance, as is now the practice with modern architects.

§ 41. *Practical Hints on Ventilation.*

Scientists have laid down the rule that 3,000 cubic feet of air per hour should be provided to each adult in order to keep a person in complete health. In school-rooms, infirmaries, and hospitals even a still greater quantity is required. This quantity of air, however, is very rarely obtainable, and as a general rule 500 cubic feet per living-room should be provided, and as much more as possible for sleeping-rooms. In barracks soldiers are allowed 600 cubic feet, and the law lays down that in common lodging-houses not less than 300 cubic feet shall be given in sleeping-rooms, and 400 feet if the room is occupied as a day-room as well. In order to obtain for each person a healthy supply of air, according to the best standard, he would require, in moving about in a room 10 ft. long, 10 ft. broad, and 10 ft. high, the air to be changed three times during every hour.

It is admitted, however, that such a thing is almost impossible to obtain; still the rule should be lived up to as nearly as possible. It is necessary to bear in mind that the capacity of a room is not everything that has to be studied, and that a certain amount of floor space is requisite as well. The height of the room has also to be taken into account,

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and taking 500 cubic feet as a space for each person the square feet of floor space would be 50 square feet with a room 10 ft. in height. A room with 40 square feet of floor space for each person and 10 ft. high would, according to the healthiest rules, require its air to be changed seven times per hour at least, and even then the space occupied by the furniture would have to be allowed for. This is a condition almost impossible to provide for, and consequently, as before stated, it should be reached as nearly as possible. The small 'Manual of Health,' by Professor De Chaumont, F.R.S., published by the Society for Promoting Christian Knowledge, presents a very clear knowledge of the principles of ventilation.

Although the quantity of air recommended by science for respiration cannot be altogether compassed in our dwellings and workshops, there are, nevertheless, means of meeting the requirements of health in this respect, by making use of proper appliances for the intake of fresh air, and for its retirement from the room by suitable outlets, a few of which may be noted with advantage. It is taken for granted that the inspector is possessed of an air-current meter or pocket anemometer, whereby to measure the intake and outgo of air.

Inlets.—With regard to the admission of fresh air by *inlets*, a window can be made into a tolerably perfect inlet ventilator by the method invented by Mr. Hincks-Bird in 1862, and simultaneously by Sir Robert Rawlinson, and it works best with a chimney in the room, any register being left open. The idea is extremely simple, as may be seen in Fig. 14. The

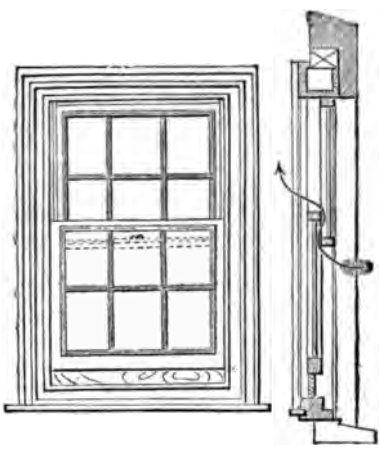

Fig. 14.

lower sash of the window must first be raised for some 3 inches, and a piece of wood corresponding to the height which the window has been raised must be placed in the opening which will then be formed in the bottom of the sash. There will thus be a space for inlet of air between the superior border of the lower and the inferior border of the upper sash. Through this space the fresh air, attracted by the difference of temperature, will pass into the room, benefit the occupants, and be removed by the chimney or other means provided for it, where there are no chimneys, such as ventilators over the doors, to the passages or staircases. This method of ventilating through the medium of the window, has been still further improved, and an example is given at fig. 15. Here the board which is fixed at the bottom of the lower sash in the former example, is connected by hinges with the frame work immediately under the lower sash. This guard can be adjusted to any angle, and

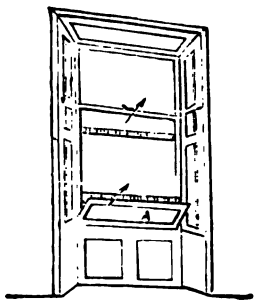

Fig. 15.

the air enters over the guard, thus giving the advantage of two inlet openings at varying levels.

A direct and more constant inflow of air is procured by the use of what are commonly termed Tobin's tubes, which can now be manufactured by any workman without the infringement of patent rights. These are generally fixed inside the room, some 4 or 5 feet in height, in the form of a tube, some 12 inches in sectional area, and the inlet of air to the tube is by way of an air brick, situated in face with the outer wall, which tends to break up the entering air. These tubes deliver the air in an upward direction towards the ceiling. They have been much improved by various makers, some having water boxes at the base of the tube, inside the thickness of the wall, so as to intercept sooty blacks, and others having canvas bags fitted inside them, so as to filter the entering air from any impurities in the outer atmosphere. It is always wise to fix a movable valve at the top of the tube, or cover the top inside the room, so as to be able to shut off or regulate the quantity of air to be admitted. A more direct and constant inflow of air, suitable for workshops, &c., can be obtained by fixing what is called a Shillito & Shorland ventilating contrivance at a reasonable height up the wall, where deemed necessary. This is shown at fig. 16, and needs no further description.

A very simple method of introducing air into a room where but very little is wanted, is obtained by

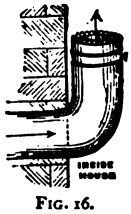

Fig. 16.

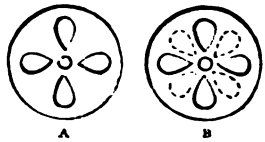

Fig. 17.

inserting in the window-panes what are known as Cooper's hit-and-miss revolving inlets, which are made of glass, and are sold by every glazier. This contrivance is given at fig. 17, the sketch B giving a view of it when open, and A when no air is being admitted. Basement cellars should always be ventilated, even if by no other means than by making use of the glass with rows of saw-cuts in it, so commonly used at railway stations, or by means of movable louvres.

Outlets—With regard to the provision of *outlets* for the respired air, fortunately these are very simple in action. A great deal of the air which has been breathed by the inmates will escape at the tops of

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the doors and windows, and always up the open flues of the chimney place. But it is nevertheless well to provide an acknowledged method of escape. This is most easily done by fixing a Boyle's or Kite's outlet ventilator in the flue of the room just underneath the cornice. Figs. 18 and 19 show Boyle's outlet ventilators for fixing in the flues, and Fig. 20 a similar contrivance by another inventor. All these figured examples are constructed of mica

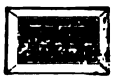

FIG. 18.

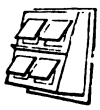

FIG. 19.

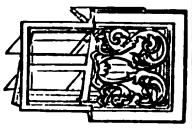

FIG. 20.

valves, working inside a frame. The suction of the air up the flue opens the valve and allows the vitiated air to escape up the chimney, but on the slightest down draught in the flue the valves close. Nothing can be seen in the room, except the more or less ornamental frame shown at fig. 18. For bedrooms this kind of ventilator is sometimes objected to, on account of the flapping noise which it makes during a high wind, in which case recourse can be had to the noiseless chimney outlet ventilator manufactured by Mr. Kite of London.

It must be understood that there are scores of various kinds of inlet and outlet contrivances, and that the foregoing are only given by way of examples.

§ 42. *Dampness in Houses.*

There is no necessity to point out to the inspector of nuisances the cause of dampness in floors, because he is aware that a damp stone pavement inside a house means that the flagging has been laid down direct upon the earth, and not upon sleeper-walls, so as to leave a space between. In like manner he will readily account for dry rot, &c., in basement floors, and even in other floors, by the fact of there being no circulation of air between the joists. There is, however, in many houses a dampness observable up the walls, due to the floor inside being at a lower level than the ground outside. This evil may be palliated to an extent by painting the interior with

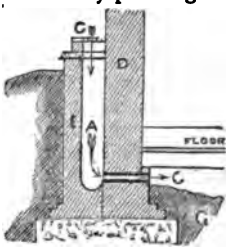

FIG. 21.

one of the best impenetrable solutions which can be obtained, but it will never be thoroughly cured without building a proper area outside the wall as shown at A, fig. 21, with an occasional inlet of air into the area-space, as drawn at C, and a passage underneath the joists from the outer air, so as to prevent the floor from perishing by rot. The damp earth will thus press against the area-wall E, and allow the wall D to recover itself.

Even when such an area has been provided around a house, the dampness very often rises by capillary attraction up the wall to a considerable height, and interferes very much with the respirable character of the air in the room. It will be found in such cases that this dampness is due to the want of a waterproof course in the main wall of the house.

Figs. 22 and 23 show a house wall properly treated, the damp-proof course being indicated by the black

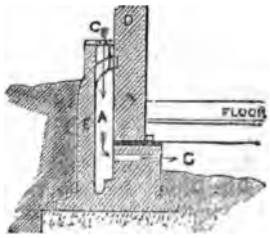

FIG. 22.

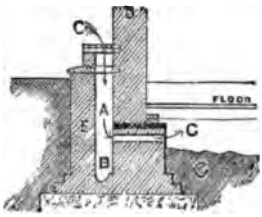

FIG. 23.

line under the line of joists with the necessary fresh air current C C below floor line. The inlet of fresh air at the top should always be above ground line, and it can always be occasional in the line of a tumbled arched-covered area, as shown in fig. 22, or it can be a constant opening, covered with a grating, as seen in fig. 23. Care should be taken in all cases to raise the top of the area wall above the ground, so as to prevent rain or mould from falling into the bottom of the area.

When sinks are emptied into any gullies in these areas, or in any extended area spaces in front of windows, or when it is necessary to drain the areas in any way, it must be borne in mind that such drainage must not be taken into a soil drain until it has been first disconnected at a safe place in the open air.

(*To be continued.*)

THE *Colonial World* states that Mr. W. Mathew Williams once witnessed a display of drunkenness among three hundred pigs, which had been given a barrel of spoiled elderberry wine, with their usual swill. 'Their behaviour,' he says, 'was intensely human, exhibiting all the usual manifestations of jolly companionship, including that advanced stage when a group were rolling over each other and grunting affectionately in tones that were very distinctly suggestive of swearing good-fellowship all round. Their reeling and staggering, and the expression of the faces, all indicated that alcohol had the same effect on pigs as on men, and that under its influence both stood precisely on the same zoological level.'

WE learn from the Boston *Medical and Surgical Journal* that a committee representing the Association for Improving the Condition of the Poor has had a conference with General Shaler and Dr. Woolsey Johnson, of the Health Department, with reference to the condition of the tenement houses of New York, the principal subject discussed being the insufficient water supply now existing in many of the houses, with its attendant uncleanliness and increased risk of disease. The committee also called the attention of the Health Commissioners to the fact that the law which requires the name of the owner or agent of every house inhabited by three or more families to be posted in the entrance had become a dead letter, and General Shaler assured them that if it was within the province of the Health Department to cause it to be done the law would be strictly enforced in the future.

A COMMITTEE of the Chicago Citizens' Association have found in practical use, on the furnaces of two of the largest bank buildings in the city, smoke-prevention appliances, which do the work expected of them. Whereupon the *Sanitary News* of Chicago pungently remarks that the fact that smoke can be prevented, is patent to all save the authorities and those owning furnaces.

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THE POSITION AND DUTIES OF GROUND LANDLORDS IN LONDON.

By Lord William Compton.*

What is the system under which the poorest class in London live, as regards only their dwellings? This question, which has been discussed lately in the press, has not yet to my mind been thoroughly answered, nor its importance completely appreciated. In the hope of throwing a little additional light on the dark picture which has been disclosed to us all, I shall attempt in a brief manner to give an answer to that question.

Nothing has struck me so much during my inquiries into the conditions under which the labouring class obtain and hold their tenements as the constant shifting which takes place in all the overpopulated districts. To arrive at the reason for these wandering habits I have devoted much of my time, and, although the result of my investigations is not entirely satisfactory, yet I think I can lay my finger on at least part of the system which causes, not only these constant migrations, but also to a great extent the evils of neglected dwellings. I do not enter into harrowing details as to the present state of some of the poorest parts of London, but shall confine my remarks to a general view of the housing of the poor in London. In the first place, who are the landlords? The general public, I believe, imagine that London is divided into properties owned by companies, by the Church, and by wealthy members of our aristocracy, and that these proprietors reap the rich results to be obtained by high rents and overcrowding. For companies, guilds, or the Church, I cannot speak; but as a son of a London landlord I may perhaps try and place the matter in its true light as regards individual owners of London property. If an inquirer visits the dwellings of the poor, and, entering their doors, asks the simple question, 'Who is your landlord?' the answer is an unknown name. Next door another name may be given, and there will seldom be found in one street or alley all the houses under one landlord. The landlord, as far as the poor people know, is the man who receives the rack-rent; and if there be a ground landlord his name even is unknown to them. We therefore find that the ostensible landlords are simply middlemen, and to arrive at a solution of my original question we must inquire into the system of 'middlemanism,' if I may use such a word. The houses of the poor may in a general way be described as held under either old ground-rent leases or renewed leases. The latter are generally held by the actual rack-renter, but the former have passed through many hands before they have reached the persons who, for practical purposes, are the present legal 'owners,' and it would take a long time to trace some of the old leases back from the present 'owner' to the ground landlord. The Public Health Act of 1875 defines the responsible 'owner' of property as 'the person for the time being receiving the rack-rent,' and defines 'rack-rent' as 'rent which is not less than two-thirds of the full net annual value of the property.' The freeholder receiving mere ground rents is not the responsible owner of the property for sanitary purposes. Now, the legal owners are responsible to the local authorities, and the original ground-leaseholder is only responsible to the proprietor of the land. This fact should not be overlooked, for it is the cause of much of the neglect which is apparent to the most casual observer. The powerlessness of the ground landlord in this matter is shown by the following instance:—Some dwellings in small courts on my father's property, which are held under original ground leases, were declared the other day unfit for habitation by the sanitary inspector. The reason for this decision was the want of sufficient closet accommodation and the want of space for proper ventilation. The houses are certainly not in a worse state than many others which, unfortunately, are not legally unfit for habitation. On hearing of the matter my father's agent appeared before the sanitary committee of the vestry, who are considering the inspector's report, and expressed the ground landlord's willingness to help in any way that was possible. The answer was, 'You must know you can do nothing; we have nothing to do with you; we can only deal with the person who receives the rack-rents.'

To return, however, to the question of leases. First, as regards ground leases, the case seems to stand as follows:—The proprietor of, may be, eighty years ago, leased his ground, which consisted then of open fields, to a tenant for building purposes under old-fashioned covenants. These leases were for nearly one hundred years, and therefore will not lapse until the beginning of next century. Plans were submitted by the speculator for blocks of houses, streets, &c., were approved by the lessor, and those buildings have been sublet and sublet until they have reached the present middlemen. Courts in the midst of a block of houses were in the course of time built over without the sanction or knowledge of the ground landlord—(it is very doubtful whether he would have had at that time the legal power to prevent it)—and now no reconstruction or improvement is possible on the part of the ground landlord until the ground leases fall in. It is thus clear that from these courts at least he derives no pecuniary benefit. Into these courts the poor have been crammed closer and closer owing to clearances elsewhere, until a cry on their behalf has at last roused public opinion. As the population has increased, so has increased the necessity for accommodation; and the middlemen, perceiving that necessity, have made their profit by it, and become rack-renters of the worst kind. Rents have been raised as middleman has succeeded middleman, and there seems no likelihood of their being reduced while the old leases run. For houses which bring into the ground landlord's pocket 1*l.* or 2*l.* each a year the middleman collects twelve to fifteen shillings a week, out of which he pays for rates, taxes, and also repairs, so that the less he spends on repairs the more profit does he make. It must be understood, however, that in consequence of constant subletting, the present middleman does not rent the houses on the same favourable terms as the original lessees. The houses are old, and in some cases demolition and rebuilding would be the only cure; but, unfortunately, they are not legally bad enough to be returned as 'unfit for habitation.' If the ground landlord had himself originally built on his property, and looked after it carefully, there would probably be nothing to complain of as regards individual proprietors; but our ancestors at the beginning of the century could hardly have been expected to foresee the ultimate fate of the property which they looked upon at that

* Reprinted from the *Pall Mall Gazette*, March 10, 1884.

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time as suburban. It is therefore evident, I think, that, certainly as regards ground-rent leases, it is the system of middlemen which has done the harm, and not the 'greed' of rich proprietors.

Next, as regards renewed leases, much can be done by stringent covenant; but even then the general inclination must be towards neglect. If the middleman gets more profit by subletting single rooms than by subletting entire houses, it is not perhaps remarkable that he takes the former course. In a 'row' that I visited this was easily proved. One house with six rooms, three of which are little more than cupboards, is rented by a sub-tenant at 11*s.* 6*d.* a week. He has kept the house in repair for years; and, with the help of two single-men lodgers, who sleep in one room, paying 2*s.* 6*d.* each for a bed, and of a small shop or store, he has managed to keep the house comparatively smart and clean. Next door no one had repaired since the new lease was granted some years ago, when the house was put into thorough repair owing to the preliminary conditions of that lease. The state of the rooms was very bad (repairs have been effected now), and from the four families—consisting of seventeen persons—who live in them the middleman receives 15*s.* 3*d.* weekly. One can therefore easily understand why single-roomed lodgers are preferred, and why overcrowding is one of the evils complained of. But even if the whole house is sublet (as in the first case I have quoted) the result is the same, as the sub-tenant in order to pay the rent takes in lodgers, and charges at the same high rate, or even higher. I know of houses where the lodgers pay 3*s.* 6*d.* for a small single room. As each week comes the rent has to be paid, or else out the sub-tenants are turned—to seek another and more neglected tenement, which can be obtained for a smaller rent. In summer, when work is brisk, rents are easier paid; but with winter comes the cry of 'work is slack,' and a change of tenement is often necessary. Discussing this matter at a working man's club, I was told by one of its members that those who left their old lodgings for new escape the payment of a week's rent, as rents are not paid in advance; while others said that whereas no cleaning or repairing was done after entering a tenement, something as a rule was done before entering. Thus constant shifting from one room to another is the rule, and not the exception. In addition to the ground landlords with large inherited properties, there are innumerable small landlords who have succeeded to the possession of small plots of ground all over London. These plots were, I suppose, acquired by a speculating ancestor, and the possessor has in all probability little else to live on but the rent paid him by middlemen. Perhaps the proprietor does not live in London, has never even seen his property, and is not sufficiently wealthy to be able to afford to keep an agent. In that case the middleman is free to act as he chooses, and having adopted his profession in order to make it pay, it would be rather remarkable if neglect as to repairs, overcrowding, and high rents were not the result. It is true that the middleman can be forced, by late Acts of Parliament, to keep the houses he has rented in a sanitary state, and overcrowding can in a great measure be prevented, if the local authorities, in whose hands the power is placed, seriously fulfil their duties (which hitherto they have failed in many cases to do); but if a middleman be forced to repair, there is no power to prevent his raising the rents, and thus in the end the poor people, who must live somewhere, have to pay extra for philanthropic legislation. I therefore arrive at this conclusion, that the middleman system is the cause of the present evils, and not the greed of ground landlords.

What can the latter do, who possess property under ground leases? They can certainly force the original lessees, if that lease contains the necessary covenants, to repair according to old-fashioned ideas; but does this tinkering up of old houses conduce to any real benefit? Try and buy up the old leases—may be suggested; but, owing to the present great value of London property, that plan would only be feasible in the case of a very wealthy man, who is not hampered by being only a tenant for life. Some there are who think that the State should become the middleman; and others suggest that the State should become the ground landlord. If either idea were adopted for London, why not for all other towns and villages of Great Britain where the neglected dwellings of the poor are also to be found?

It seems to be acknowledged on all hands that but one system has really succeeded in London for the improvement of the poor, both as to their tenements and as to themselves, and that is the system adopted by Miss Octavia Hill—active supervision and gradual improvement. The former can and should be exercised by all those holding London property; the latter in the case of ground leases is perfectly impossible, except by the action of the local authorities, and to the future must be left the perfection of any philanthropic plans. Much, however, can be done at once to mitigate the evils which now occupy the public mind. Ground landlords should actively inquire into and supervise all matters connected with their property, and with those who live on it. I am convinced that those landlords who have it in their power to do so would find it more profitable, even in a pecuniary sense, if they dispensed with middlemen altogether, and employed their own visitors and agents to collect fair rents and to prevent overcrowding and neglect of repairs. If the proprietor of the land cannot afford agents or an overseer, he should nevertheless exercise a personal supervision by communication with clergymen, charitable societies, and missions, all of whom have been struggling for years against the abuses of the middleman system. Each one who has a proprietary interest in London property should be 'up and doing,' and also should 'learn to labour' in order to achieve the great object in view. We are told that the upper classes are neither toilers nor spinners, but they certainly can become so.

THE sanitary authorities of Rio Janeiro are now empowered to inflict a fine of thirty dollars, and an additional fine of three dollars, on the owners and tenants of overcrowded courts, lodgings, &c., for each person over the proper number. The places may be closed up by the Board of Health until they are repaired; if this is not done, the government may close or pull down the building. The building department of the city will not allow any courts or small houses to be built within certain limits. More important cities may take a lesson.

AT the last meeting of the Blaydon Local Board, Dr. Brown stated that small-pox had been brought into the district by a little girl who caught the infection whilst attending a school in Newcastle. He said that it was beyond question that schools were the most fertile sources of infection.

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THE MALVERN HILLS.

By an Occasional Contributor.

If anything could justify the recent crusade of Mr. Henry George against landlords and landlordism, an excuse might be found for it in the filching of common lands which has been the too frequent habit of property owners in the past. The present generation has awakened to a sense of the irreparable injury to the public welfare caused by the gradual nibbling away of commons and open spaces; and several societies now exist which make it their special business to resist new encroachments. But unhappily we cannot throw open again to public use the enclosures of the past. A legal title has in innumerable instances been created by efflux of time over large tracts of land which once belonged to the public, and which are still morally theirs. We cannot expect that every threatened open space will find a saviour with the ample funds and inexhaustible energy of the Corporation of London. Epping Forest is perhaps the best known instance of encroachments upon the public rights; but it has its analogues in almost every part of the kingdom, and it behoves every citizen to be on the alert against similar calamities in his own district.

One of the most serious and impudent attempts of recent times to rob the people of their own has been made at Malvern. Malvern has long been known for the purity of its air and water, and not many years ago was much in repute for the practice of hydropathy, then in its infancy. Although there are still a number of hydropathic establishments in the place, it is now chiefly resorted to by invalids and brain-workers in search of rest, quiet, and an equable climate. Walks among the hills are the great, indeed the only, diversion at Malvern. Without them it would be nothing; its occupation would be gone; it would be the play of 'Hamlet' without the part of the Prince of Denmark.

The hills, which are the glory of Malvern, are a narrow but lofty chain, dividing Worcestershire from Herefordshire, some eight or nine miles in length, of which between three and four miles from the north end to the Camp Hill are the best known and the most frequented. This part of the range contains about 1,200 or 1,300 acres of open and apparently undivided land, though it appears that it includes fragments of two counties, seven different parishes, and seven different manors. The hills rise abruptly and precipitously from the Severn valley, and the topmost summit is 1,444 feet above the level of the sea. From this summit a view of an extraordinarily large tract of country—not less than a hundred miles across—can be had, and it is the fashion to believe that on a fine day portions of twelve counties can be discerned. Thus Macaulay, in his poem about the Spanish Armada, says of a beacon-fire that—

> Twelve fair counties saw the blaze
> From Malvern's lonely height.

The average pleasure-seeker is less interested in this than in the verdure of the hills, their springy turf, the bright yellow gorse, and the beautiful mosses that carpet the slopes. The different hills have all separate characteristics of their own; but perhaps the finest view of all is that to be obtained at the Camp Hill, which was once the seat of a British camp, and some of the slopes of which are clothed in pines. Dotted round these hills are the various Malvern townlets—North Malvern, Malvern Link, West Malvern, Little Malvern, Great Malvern—linked together 'like beads upon a string.' They are at all elevations, and present every variety of aspect and climate. Great Malvern itself looks due east over a smiling valley, and the houses are built in terraces upon the slopes. It is a quiet place, with no attractions but the hills and its proximity to some few towns of antiquarian interest, such as Worcester, Hereford, and Tewkesbury. Its chief drawback is the absence of sun in the afternoon; for the heights above cut off the sun's rays as the afternoon begins, and long before sunset a gradually lengthening shadow creeps all over the valley.

Centuries ago, the district round Malvern formed part of Malvern Chase, a royal forest, which was disafforested in the time of Charles I. The king took one-third as freehold in compensation for the surrender of his forestal rights, and from this 'King's Third' are descended some anomalous and inconvenient fragments of land on the hills which are now claimed as private property by six different owners. The other two-thirds were left to lords, freeholders, and commoners to remain free and commonable for ever, with an express instruction that no 'mean lords of fees or manors' should be so very mean as to enclose any portion of the Chase, or should fell any trees, or hinder the commoners of their old rights of pastures or estovers. These common rights are not limited to particular manors; but, as in Epping Forest, extend over all that remains of the Chase.

For a considerable number of years some quiet squattings on the hills had been made without protest by the public. The usual plan in these cases was for a squatter boldly to build himself a hut in some desirable situation, and fence in a small area of the surrounding land. Being unmolested, he would by-and-by enlarge his borders, and build himself a respectable cottage. If the encroachment were in the parish of Malvern, to him would then come the agent of the lord of the manor, and point out the iniquity of his conduct. Legal proceedings would be talked of, and forcible ejectment threatened; but, as the object of the lord of the manor was only the declaration of a legal right, it would eventually be amicably settled that, on the tenant signing an acknowledgment (on a piece of paper with a neatly executed plan of the estate upon it) that the land was the property of the lord of the manor, a mere peppercorn rent would satisfy the injured feelings of the latter. But later, when a legal title had been established through the inaction of the public, down would come the agent and exact full value for property which had been—there is no other word for it—stolen from the public. If the squatter or his successor declined to make acknowledgment, he would be badgered and worried till he eventually gave in, though, if he had the moral courage to continue his resistance, the title would of course be eventually vested in him.

It is stated in the report of a committee appointed to resist these encroachments, that a large and valuable property has been obtained by the lady of the manor of the parish of Malvern in the way above described, and in one part, at North Malvern, property of the value of over 1,100*l.* has been thus obtained; and at the Link, Newtown, and in other places, property of the annual value of 550*l.* has been lost to the public.

It may appear strange that the freeholders, tenants, and commoners should suffer this taking

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away of their common land. One reason for their quiet submission has been that an individual has not so much at stake as the lady of the manor. A freeholder, tenant, or commoner, having only his share of the rights of pasturage, cannot be expected to come forward and bear the expense and annoyance of litigation for the sake of others who should equally with himself interfere. Another reason for not interfering is, that a very large number of the inhabitants of Malvern are lessees under the lady of the manor—property there being held on leases for lives, a tenure that gives to the lessor the greatest influence over the lessee. The lessee in this case is further silenced by a clause in his lease whereby he agrees that it shall be lawful for the lady of the manor at any time to enclose the common or waste land within the manor and parish of Malvern, without making to the lessee any compensation for the right of common.

Prior to the agitation presently to be spoken of, there had been several attempts to put a stop to the encroachments, but none had been effective. In 1858 a committee was appointed by the freeholders, tenants, and commoners to prevent encroachments; but as few of the members were independent of the lady of the manor, very little was done. In 1881 a freeholder and commoner took proceedings in the County Court against an encroacher; and the judge decided that the encroachment should be abated, and that the fence should be put back. This one case cost the prosecutor about 100*l.*, besides a great deal of annoyance and insult.

Events, however, had meanwhile happened which stirred even the torpid blood of the Malvernians into action. The lord of the manor which includes North Hill, perhaps the finest and most accessible of the whole range, enclosed that hill by putting a substantial iron fence round it; whilst a squatter erected a house on the very top of the Worcestershire Beacon, the highest hill of the chain. A committee was appointed to take steps for the preservation of the hills, and to inquire what dormant rights might exist hostile to the public interests. Negotiations were entered into with the pseudo-owner of North Hill, which resulted in an arrangement by which, while declaring himself in a position to prove his title to the land—which appears, indeed, to be part of the 'King's Third' before spoken of—he consented to dedicate the hill to the public on condition that an Act of Parliament was obtained within twelve years creating a body of Conservators with power to protect and manage the hills.

But the lady of the manor of the parish of Malvern did not prove equally complaisant. A Bill was promoted in the autumn of 1882 to give effect to the agreements already made by the committee, and giving powers to make others; but the feeling of the town was so strong against the omission from the Bill of definite action with regard to the larger encroacher that it was rejected with contumely, and died a natural death. It was felt, however, to be so important that the hills should be preserved for public enjoyment that another committee was formed, and a second Bill was prepared, which is now before Parliament, and which, as serious opposition to it has been withdrawn, may be expected to become law before the session is over.

Shortly, this Bill proposes that a body of Conservators, chosen partly by lords of the manor and partly by inhabitants in vestry, shall be invested with the rights and remedies which individual freeholders already have over the hills and common lands, and with powers of management and regulation over such portions as may from time to time be placed under their control by lords of manors and owners of soil. The Conservators are at all times to take all necessary measures to keep the hills unenclosed, unbuilt on, and to maintain all existing rights of common and commonable rights on all parts of the hills, and to prevent any injury to the hills. Any court of summary jurisdiction is to have power to require any person to abstain from enclosing or building upon any part of the hills or waste or common lands not now enclosed or built upon. This Bill has already passed a committee of the House of Lords, and, should it receive the Royal assent, it will serve to protect the hills for the future from the rapacity of 'land grabbers,' and to preserve them in all their native loveliness for the enjoyment of the nation at large.

THE SANITARY USE OF PERFUMES.

By C. T. KINGZETT, F.I.C., F.C.S.

IN the last issue of the SANITARY RECORD there appeared a *résumé* of a lecture delivered by Mr. Eugene Rimmel at St. James's Hall upon the sanitary use of perfumes, and I desire to offer a few remarks with reference to this subject.

In the first place, Mr. Rimmel is wrong in stating that certain essential oils produce 'peroxide of hydrogen which in contact with the atmosphere disengages ozone—the great air purifier.' They do nothing of the kind. The whole chemistry of the subject, so far as it has been worked out since the time of Schönbein, represents my own individual labours, and I have given a complete account thereof in my 'Nature's Hygiene,' published by Bailliere & Co. in 1880.*

Upon reference to this volume it will be found that when essential oils are exposed to the atmosphere, or are oxidised by an artificial process in the presence of water, they give rise to the production of peroxide of hydrogen as one of several products of the process, but in no case and under no circumstances do they give rise to the production of ozone, and I have further shown that, except to the extent to which ozone is produced as a constituent of the atmosphere during certain electrical phenomena, it is not produced otherwise, and that its sanitary importance is insignificant as compared with that of peroxide of hydrogen.

This latter substance is produced in enormous quantities, notably by atmospheric oxidation of the essential oils volatilised into the atmosphere from pine and eucalyptus forests. Its production is accompanied with that of thymol, a soluble camphor, and several other substances which in their collective capacity constitute the active principles to the presence of which substances in the atmosphere is to be attributed the health-giving properties of the said forests.

It is singular to find that Mr. Rimmel, although in commerce he avails himself of a knowledge of the facts which have been brought to light by my own investigations, yet makes no mention whatever of my name in his lecture.

* See also *Jour. Chem. Soc.*, 2nd series, Vol. xii., p. 511; Vol. xiii., p. 210; and *Chemical News*, Vol. xxxii., p. 138; Vol. xxxiv., p. 127; and Vol. xxxix., p. 279.

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One word as regards terebene. This is not the first time that I have had occasion to state in so many words that terebene is of less value as a sanitary re-agent than ordinary turpentine in my opinion and for this reason: that whereas turpentine, better than all other essential oils and expensive perfumes, yields the products to which I have above made reference; terebene (which is turpentine which has been altered chemically by sulphuric acid) is not acted upon by oxygen in the same way, and generates neither peroxide of hydrogen nor ozone. So far, therefore, as its sanitary properties are to be traced to its power of generating peroxide of hydrogen, it is a failure; and all that can be said for it is that it has a pleasant odour.* The essences named by Mr. Rimmel—viz., eucalyptus, lavender, rosemary, thyme, peppermint, and pennyroyal—are all very pleasant and useful re-agents in their way, but in point of usefulness on a large scale they cannot compare with common turpentine, which is far cheaper, and which generates when subjected to the processes which are the subject of my own inventions—a very much larger quantity of the products upon which all these essential oils depend alike for their efficacy as antiseptics and disinfectants.

Coming now to Mr. Rimmel's 'aromatic ozonizer,' a preparation consisting of sawdust impregnated with certain perfumes, notably containing eucalyptus oil, I make the assertion that it does not generate ozone; and I challenge Mr. Rimmel or any living chemist to prove that it can generate ozone. What is more, as regards its efficiency as a sanitary re-agent, I say that Mr. Rimmel would do better to use turpentine in the place of eucalyptus oil; but of course that would not do, because turpentine does not smell quite so pleasantly as does the mixture of essences which he employs for this purpose.

The talk about toilet waters being of an ozonic character is also so much nonsense: they are not ozonic in any sense of the word.

I have studied very deeply the whole question of the sanitary properties of essential oils and perfumes, and I have succeeded in tracing these properties to the true causes; and also in inventing, upon the bases of my acquired knowledge, certain processes by which I am enabled to produce on a large scale the very substances which alone are generated from the perfumes which are secreted by different trees and plants. It is true that these essences or perfumes are pleasant things in themselves, and that they do exercise some antiseptic influence; but, viewed as sanitary re-agents, they are not to be compared with the products to which they can give rise by oxidation with air. It is these products that I make, and it is upon the scientific credit of my work that the sale of such preparations as Mr. Rimmel's 'ozonizer' largely depend. Anybody may make such an ozonizer, and a better one, by mixing, as I have said before, turpentine with sawdust.

Very different are the preparations which I have christened 'Sanitas.' They consist of the products of oxidation, and not of the raw substances merely. To them, and to them alone, recourse must be had if it be really desired to take advantage of the sanitary uses of perfumes.

* See my Paper published in the *Journal of the Society of Arts*, February 16, 1877.

THE

SANITARY RECORD.

APRIL 15, 1884.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

REGULATIONS FOR HOUSES LET IN LODGINGS.

FREQUENT references have lately been made to the importance of the vestries and local boards of the metropolis making 'regulations' for lodging-houses occupied by the poor, as by putting them into force it is believed that many of the scandals caused by the overcrowding and filthy condition of the houses of the poor can be prevented. The regulations are made under the Sanitary Act, 1866, and Amendment Act, 1874, for the purpose of (1) fixing the number of persons who may occupy rooms in these houses, (2) for the registration of such houses, (3) for their periodical inspection and the keeping of them in a cleanly and wholesome state, (4) for enforcing privy accommodation and other appliances as well as means of cleanliness, (5) for periodical cleansing, &c., (6) for ventilation of rooms, (7) for paving and drainage of the premises, (8) for the separation of the sexes, and (9) for precautions to be taken against infectious diseases. The bare enumeration of the matters concerning which regulations can be made, show the great powers possessed by the sanitary authorities if they will make proper and efficient regulations, and see that they are properly carried out.

In 1880 the Local Government Board framed a set of by-laws for the guidance of local authorities willing to put these clauses of the Sanitary Acts into operation; and in 1877 the Society of Medical Officers of Health framed draft regulations for the assistance of their members, and have revised them quite lately. The two sets differ in several points. Thus the Local Government Board propose that all lodging-houses above a certain rental, or in which the rooms are let out at more than a certain sum per week, to be fixed by the local authority, shall be exempt from the operation of the regulations. The medical officers of health are, however, of opinion that 'any house may be registered by order of the vestry at its discretion,' which seems to be far better than adopting a hard and fast line of rental either for the whole house or for the rooms let off. It is true that by one plan all houses under a certain rental that are let in lodgings will come under the regulations without any special order, whilst by the other an order must be made by the vestry in each instance, or by a committee specially empowered by the vestry. The plan proposed by the medical officers seems to be much preferable, as it will enable a prosecution for offences to be taken against the owner or person letting the premises on the production of the order of registration instead of the rate book or other proof of the amount of rental. Also because there will be greater elasticity as re-

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gards the action to be taken against owners, so that many houses will be brought under supervision by those of the medical officers when necessary, which would be omitted under the other plan. There is, however, an essential difference in the two sets as to the cubical air space to be allowed in rooms occupied as dwelling or sleeping rooms. The Local Government Board are of opinion that there should be 400 cubic feet of air allowed for each adult, or for two children under ten years of age, whilst the society provides that there shall be only 350 cubic feet of air space for each adult or for two children under twelve years of age. The Local Government Board follows its own traditions, whilst the medical officers appear to have been guided by what in their opinion is the utmost space that can fairly be allowed in such houses without oppression of the poor. The absolute space is to a certain extent capable of being modified by means of ventilation, and when the habits of the poor in this respect are considered—viz., that they stop up all means of ventilation they can, the reduced space seems to be a step backward, and therefore objectionable. It is certainly provided in both Acts that the rooms, passages, and staircases shall be ventilated daily; but who is to see that the keeper, landlord, or occupier will attend to this? The Local Government Board is extremely grandmotherly in their requirements, as they provide that every lodger shall keep the window of a sleeping room fully open for *one hour* at least every morning and afternoon, except when the weather necessitates its being closed, or the room is occupied by a sick person. By another of the Local Government Board's regulations an occupier of a room is rendered liable to a penalty if the chamber utensil is not thoroughly cleansed every day. If legislation is pushed to this extent, and action were taken for a penalty, the case would probably end by being laughed out of court.

As regards water-closets, the society proposes one closet for twelve adults, which might mean twenty persons (adults and children), whilst the Local Government Board proposes the same for twelve persons. The society requires a water supply of twelve gallons for every adult, whilst the Local Government Board says nothing about the quantity or sufficiency of the flush. The quantity proposed by the society is certainly too small when the careless habits of the poor are taken into consideration.

After a careful comparison of the two sets of regulations, those of the society appear to be the more suitable for urban districts, including London; indeed, it is expressly stated that they were prepared by the metropolitan members, and they do not include any provision as to cesspits and earth-closets, such as are required in rural districts. The advantage of having regulations in force in a district are very great. In the first place, it is difficult to prove that dirty, and, to a certain extent, dilapidated houses, are injurious to health, so that some magistrates exhibit great reluctance to make orders for the repair of leaking roofs, broken window-sashes, and even for the repair of holes in a roof. The regulations put an end to this difficulty, as it is only necessary to show that the houses had not been cleaned or other things done to the satisfaction of the vestry, in order to obtain a penalty for neglect. Another material point is that the penalty accrues for neglect of the notice, whilst, under the Nuisances Removal Act, no penalty is incurred for neglect until after a magistrate's order has been obtained for the abatement of the nuisance. Again, under the regulations, owners are bound to provide for a water supply to the water-closet by means of a service or flushing-box, independent of the cistern provided for the general water supply of the house, and the overflow or warning-pipe is not to be connected with any soil-pipe, house-drain, or sewer. These are important, as at present in the metropolis there is no power to compel a water supply for domestic, but only for sanitary, purposes, so that the same cistern is frequently used for supplying water for drinking and for flushing closets. Under Clause 11 of the regulations proposed by the Society of Medical Officers of Health, the keeper of a registered house, and every lodger in any room wherein an infectious disease shall occur, is required to give immediate notice in writing of the occurrence of such cases to the inspector, and is bound to carry out without delay all measures for disinfection which the sanitary officers may direct. This is important, especially as regards the notification of disease or death, but it ought not to relieve the sanitary authority or their officers from the official disinfection of the rooms, which is usually done at present by the sanitary officers of the vestry.

ENFRANCHISEMENT OF COPYHOLDS AND LEASEHOLDS.

CROMWELL is reported to have described the land laws of his period as an 'ungodly jumble,' and we much fear that his description is equally applicable at the present day. It is by no means our purpose to attempt a disquisition on the various systems of land tenure which exasperate tenants and fatten lawyers; but there is one aspect of them which has lately been brought into prominent notice that may naturally and properly be discussed in these pages. It has been said that one cause of the horrors of the housing of the poor is due to the fact that nearly all the property in London is leasehold. Fag-ends of leases are the happy hunting-ground of the speculative housemonger, whose great object is to recoup his expenditure before the period arrives when the premises have to be restored to the ground landlord in habitable condition. It is melancholy to think of the condition to which the mushroom houses now being erected by thousands all over the metropolis will have arrived by the time their leases expire. Their life will be a short but hardly merry one, and examples of longevity amongst them will be very rare. Human nature being what it is, it is perhaps idle to expect that leaseholders will build very substantial houses for the ultimate benefit of other people; and an agitation has hence arisen for the compulsory enfranchisement of leaseholds on the application of the tenant.

It is significant of the perfunctory and haphazard way in which our legislation is now conducted that, whilst a Copyhold Enfranchisement Bill was allowed a second reading by the Commons on March 12, and was referred to a Select Committee, a Bill for the Enfranchisement of Leaseholds was thrown out a week after, and denied further consideration of any kind. At least no harm would have been done by referring both Bills to the same Select Committee, in order that the grain might have been winnowed from the chaff. It can hardly be said that the country is yet ripe for a measure so sweeping as Mr. Broadhurst's, though the position of a leaseholder is often a very hard one. Of all forms of tenure, freehold is of course the best. Copyhold

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property is preferable to leasehold, and its enfranchisement is no doubt an easier matter to manage. The object of the Bill which Mr. Waugh introduced on the 12th ult. was to amend the existing Acts and to promote the enfranchisement of lands of copyhold and customary tenure, and of lands subject to this tenure by other rights. The various speakers in the course of the debate made it clear that much injustice to tenants of copyhold property may be perpetrated without redress; and Mr. Hastings adduced facts to prove that wherever land was held under copyhold tenure in the vicinity of large towns it was a distinct hindrance to the proper housing of the population. The Home Secretary expressed himself in favour of the principle of the Bill, and suggested that it might be amended in detail by a Select Committee, to which it was thereupon referred.

It is a pity that the same course was not adopted in the case of Mr. Broadhurst's Bill, introduced on March 19; but it was apparently thought by the landlord interest that this would pledge the House too obviously to the principle of the Bill, and it was therefore thrown out. The debate was an interesting one, and brought out most of the aspects of the case. Mr. Broadhurst proposed to enable any person having an unexpired term of twenty years of a lease of any house, cottage, or chapel, to purchase the fee simple, by applying to the county court to have the title settled and the price fixed. It was contended by the Attorney-General that the effect of this might be to turn one of the houses in Belgrave Square into a hotel or tallow chandler's factory. This objection was met in the Bill by a proposal that the leaseholder, when he became possessed of the freehold, should not be allowed to use the house for any other purpose than that indicated in the original lease for, at all events, such a number of years as the original lease was granted for. This, it is true, would not be protection for all time; and a better suggestion appears to be that the local authority should have power to prevent a house being used for a purpose out of keeping with or injurious to the neighbourhood in which it is situated.

It was very generally admitted that household property is apt to get dilapidated and unwholesome towards the end of the lease. That it has had a share in intensifying the miseries of workmen's dwellings there can be no doubt. Whether the multiplication of freeholders would avert this evil is perhaps open to question; but the paralysing effects of leaseholds as regards development of neighbourhoods and solidity of building are abundantly manifest. Mr. Broadhurst's Bill may not become law next year, or the year after that; but some concession to leaseholders' interests will inevitably have to be made by Parliament before long.

The system of leaseholds for ninety-nine years or definite terms is bad enough, but that of leases for lives is infinitely worse. No doubt Mr. Broadhurst would have carried his point if his Bill had confined itself in the first instance to these latter; and we observe with satisfaction that Mr. Ross, the member for St. Ives, has now introduced a Bill for their compulsory enfranchisement. Leases for lives are little better than gambling in flesh and blood. A tenant is granted a lease of his property during the lives of a number of persons, usually three. He selects the most healthy lives amongst his acquaintance, or inserts the names of persons whose health he thinks will be well looked after. The lives of members of the Royal Family often appear in leases, and it was stated by Mr. Broadhurst that when the Prince of Wales was ill it would have cost a Malvern tenant 1,500*l.* to insert another 'life' in the lease if the Prince had died. Perhaps the evils of the system could not be better illustrated than by the following anecdote, which appeared in a recent *Pall Mall Gazette*:—

A thrifty farmer having saved up enough to take up a lease in his homestead, arranged accordingly with the steward, and selected as his three lives two of his children and a near relative, all, as he thought, good lives; but death removed all three in a year or so. Under these trying circumstances he expected the lord of the manor—who, by the way, was an M.P.—would allow him to put on fresh lives for a more or less nominal consideration. But the steward demanded the pound of flesh. 'Very well,' said the farmer, 'I'll be bound the 'squire and his family shall never again profit by my loss as long as they live, for I'll put he and his only two sons up, if you please, on the new lease.'

This iniquitous system is in force in a good many places—mostly in the West of England, and with the worst results. Trade is crippled, progress stopped, and as there is a direct inducement to the tenants to do as little as possible the houses are all more or less antiquated and tumbledown. Cases could be cited by the hundred showing the gross injustice of the system. In a little book called the 'Bitter Cry of Cornish Leaseholders,' recently published, some very flagrant cases are reported. The mode adopted appears to be different in various parts of the country; but the principle is in effect the same. A man is granted a lease for three lives. Let us suppose him to have expended a large sum of money in the anticipation that he will be recouped of his outlay before the last life drops in, and that shortly after all the three lives die in quick succession. Either he is turned out with no compensation at all, or is permitted to renew his lease at a rental enormously increased through the improvements which he himself has made. At Malvern the plan prevails of granting a lease originally for three lives, and afterwards of substituting a new life as each old one drops in. The more a man spends over the premises, and the more useful he makes them to him, the greater is the fine for inserting a new life in the lease. He is absolutely in the hands of the landlord as to the amount of the fine, and if he declines to pay the price he will have to give up possession as soon as the remaining lives fall in. And if, as was recently the case in connection with the encroachments on the Malvern Hills, a tenant makes himself obnoxious to the lord, the agent of the latter absolutely refuses to treat with him when he desires to insert a new life. All this is a refined form of cruelty, and is absolutely contrary to the spirit of the age. Leases for lives ought, without doubt, to be at once put a stop to. If this is too drastic a reform, then let Mr. Ross's proposal to give the tenant the right to enfranchise the leasehold be passed into law. It ought not to be difficult to appraise the actuarial value of lives of persons whose ages, conditions of life, and personal health are known, and to calculate the amount of rent which might be expected to accrue before these persons died. In any case, all future agreements of the kind ought at once to be made illegal.

Sir James Caird has suggested a plan for dealing with copyhold property, the principle of which might perhaps be usefully adopted for copyholds and lease-

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holds. Sir James proposes that in a term of years, say thirty, the present power of enfranchising copyholds should cease, and that all copyhold lands should then be freehold. During the intervening period, either the lords or the tenants might make use of the compulsory powers of enfranchisement that now exist. Of course this could not be so easily done in the case of leaseholds; but might it not be enacted that, at the end of a fixed period, the principle of Mr. Broadhurst's Bill should be adopted in the case of all new leases granted after it received the Royal Assent? To get rid of all leasehold property is admittedly impossible—at any rate, at present. But if the condition of possible enfranchisement were well understood by both parties at the time the lease was granted, the cry of 'confiscation,' which was so potent in the recent debate, would be effectually silenced.

PRIVATE BILL LEGISLATION.

THE House of Commons appears to regard as an academic question, only affecting it in the abstract, its present mode of legislating on private Bills, to which its attention has more than once been directed by Mr. Craig Sellar. Although it cannot be said that any arguments of special novelty were brought forward in the debate which took place on March 14, the anomalies of the present system were made abundantly clear. Parliament has already far more to do than it can manage to get through; and that it should in its collective capacity carefully examine the merits of every private Bill brought before it, is of course out of the question. Yet it is undeniable that some intelligent and consistent supervision of local proposals is absolutely required if each town or district is not to be a law unto itself. We have often commented upon the extraordinary and contradictory provisions which find their way into the Bills promoted by corporations or local boards. It is true that the Local Government Board now make reports to Parliament on local Bills of this sort, and that since Mr. Sclater Booth's committee of 1882 more attention has been paid to the criticisms of the Board. But that a committee of four or five uninstructed members of Parliament should have practically uncontrolled powers of deciding whether a Bill shall or shall not become binding law is too great an anomaly to be much longer endured.

In Parliamentary committee rooms, indeed, the game of lottery is played on a scale of unprecedented grandeur. We need only instance the Manchester Ship Canal scheme of last session as an example, differing from many others only in the variety and importance of the interests involved. Whether local inquiries in the neighbourhood, or a joint Committee of both Houses, be the preferable avenue of escape from the present deadlock, need not now be discussed. The first thing to be done is to prevail upon the Ministry to take up the question with the serious intention of instituting a thorough reform. Mr. Dodson has expressed the passive sympathy of the Government with the efforts of those who are dissatisfied with the existing state of things, and has promised that by and by, when the Cabinet have nothing else to think of, the question shall be looked into. It is rumoured that a select committee will be appointed to consider the subject. This would certainly be a step in the right direction, and the report of the committee would in any case serve to educate public opinion on the grave defects of the present system.

Cheap legislation is as important in its way as cheap justice. We shall not now inquire what proportion of the five millions sterling spent by railway companies in promoting or opposing bills during the last dozen years was needlessly and wastefully expended; but ratepayers have a special interest in inquiring why a million and a half should have been spent by corporations and local boards in the same period and for the same purpose. Mr. Dodson dismissed somewhat contemptuously Mr. Craig Sellar's suggestion of local inquiries in the districts concerned, as having been tried and found wanting. All local Bills are not of the same kind, however, and arguments which might be effective in the case of a new railway scheme affecting existing monopolies would be entirely inapplicable in the case of a corporation Bill designed for the better government of a borough. It is with the latter class of Bills that we are more immediately concerned, and it is difficult to believe that a local inquiry conducted by an expert in the neighbourhood itself would not at once be more economical, more expeditious, and infinitely more satisfactory to all parties than a heated and unseemly wrangle before half a dozen country gentlemen in the committee room at Westminster.

NOTES OF THE MONTH.

'ARTERIAL DRAINAGE.'

SIR GEORGE AIRY has taken advantage of a controversy which is raging in the columns of the *Athenæum*, as to the misapplication of words in professional use, to protest against the term *arterial drainage*. Never, says Sir George, was a phrase constructed so false in its analogy, so singularly inappropriate and absurd, as this. Every man of moderate education knows that an 'artery' is a large tube, through which large currents of blood rush from the great central reservoir, the heart, to be divided into smaller currents running through smaller tubes, these again and again to be subdivided till they become microscopically small. This is not analogous to what in the newspapers is called 'arterial drainage'; it is exactly the opposite. It is true that there are instances to which the word 'arterial' would apply; as when sewage, previously collected in large quantities, is distributed in small streams for irrigation. The term would also apply correctly to water supply for individual houses, to individual gas supply, and the like. But to apply the term, which is justly used for these, to fluid movements of exactly opposite character, is ridiculous. There is one great movement of blood in the animal body which is precisely similar to that of sewage, namely, the motion of the blood in the veins. Here the blood is collected from microscopic vessels, united successively into larger and larger ducts, and finally delivered to the lungs in one very large torrent. If an anatomical term must be used for town drainage, it ought to be 'venous drainage.' Sir George suggests that the two kinds of movement should be called 'collective drainage' and 'distributive supply,' but we are afraid the term to which he objects has got too firm a hold of sanitarian literature to be easily displaced.

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THE HOUSING OF THE POOR.

A GOOD deal of what has been spoken and written on the subject of the housing of the poor is economically false or beside the mark. The better class of artisans are excellently well looked after by the great joint stock companies that have sprung into existence. It is those whose living is scanty and at the best precarious that need attention. In an excellent report, recently presented to the Camberwell Vestry, Dr. Bristowe brings back the discussion into its proper lines. The state of the houses of the poor depends (Dr. Bristowe observes) on three conditions :—(1) The conduct of the poor themselves ; (2) the conduct of the landlords or their agents ; and (3) the conduct of the authorities constituted by law to enforce the provisions of the sanitary Acts. As regards the first point, Dr. Bristowe reminds those persons who, with questionable authority, have been prominent in discussing the subject, that the fact must be recognised that, do what a sanitary authority will, a considerable proportion of the population will live in filth, and what others term misery ; their habits and tendencies are opposed to all sanitary principles, and they are certain to remain a discredit to themselves and their sanitary guardians. They are improvident and dirty; they accumulate all kinds of filth in their sitting-rooms, and they allow trade refuse to decompose in them ; they break up their dustbins, cistern-covers, and bannisters for firewood ; they sell their drain-traps and water-fittings as old metal ; they block up their closets and drains with rags and shavings. How to deal with such people is indeed a difficult problem. Slovenliness, improvidence, dishonesty, offences against the seventh commandment, lie beyond the immediate scope of the duties of sanitary authorities ; they must be dealt with, if dealt with at all by the common law of the land on the one hand, and on the other by the clergy and their associates, and other charitable persons and institutions that devote themselves to the welfare of the poor. As to the conduct of the landlords or their agents, Dr. Bristowe observes that small owners naturally expect some return from the property in the purchase of which many have invested their savings, and hence are often loth to spend money lavishly on it, especially if they have tenants who, wantonly or of design, injure and destroy works executed presumably for their benefit. As a general rule, he finds that landlords who look after their own property are those who keep their houses in the best sanitary condition ; and that, to a large extent, they readily co-operate with the sanitary officers, and even look to them for advice. The greatest difficulty is experienced with property managed by agents and representatives of building societies. Dr. Bristowe thinks that the law should be strengthened as regards trade nuisances, the enforcement of a supply of wholesome drinking water, compelling house-to-house inspections, and securing admission to premises for this purpose, and requiring the removal of the infectious sick to hospital.

SEWER-GAS AND DISEASE.

SOME notable instances of the influence of sewer-gas in the production of disease are recorded by Mr. Meredith in a recent report to the Wellington Local Board. Cases of diphtheritic illness had for some time been prevalent in the place, but these showed signs of abatement. In February of last year, however, a fatal case occurred, which was clearly traced to the escape of sewer-gas from a defective water-closet, and to the absence of ventilating outlets for the drains. A second death occurred in May, and, like the former one, was found in close association with unsanitary conditions. The back kitchen had a broken drain, allowing free access of sewer gas, and it was in direct communication with the town sewer. No further deaths occurred until October, when four were registered, but Mr. Meredith found it difficult to connect them together, although he believed there was some connection either directly or indirectly. The same condition, that of an imperfect drain permitting free escape of sewer-gas, was also the cause of a case of scarlatina. A brother of this patient was taken ill with a sore throat, ending in a modified form of quinsy ; but there was no ground for thinking his ailment in any way scarlatinal. About a week later, the person first referred to sickened, and the sickness developed marked scarlet fever characteristics. The occupants of the adjoining houses, who were exposed to the same nuisance, suffered from forms of blood-poisoning about the same time. In investigating the cause of a case of typhoid fever, Mr. Meredith found that the house in which it occurred was in a very defective condition. In addition to this, it was in close proximity to a serious nuisance from a grate close to the pump from which the water supply was obtained. The drain permitted sewage matter to percolate into the well, and sewer-gas to pass through the walling of the house into the rooms. Special mention is made in the report of the large number of nuisances that arise from broken drains, and from the defective ventilation of the sewers. Some attempt has been made to improve this state of things, but Mr. Meredith urges the need for further and sustained improvement with much earnestness.

THE ISOLATION OF CHILDREN IN HOSPITALS.

WHEN inquiring on behalf of the Local Government Board into the use and influence of infectious hospitals, Dr. Thorne Thorne found that success in securing the isolation of young children had by no means been obtained at once, but that it had been progressive, and that it had been in the main brought about by the steady diffusion of the reports made by previous patients as to the comforts and excellence of nursing obtained within the several hospitals. An instance of this kind is recorded by Mr. Henry May in a recent report on the prevalence of small-pox in Aston Manor. In the case of a child where the parents refused to part with it, when other arguments failed, the mother was allowed to accompany it into the hospital, and, after a few days' stay, she cheerfully left it there. When the first few convalescents had been discharged, the reports they spread of the kindness and comfort they had experienced made the matter of isolation less difficult.

INFECTIOUS DISEASES AT CALCUTTA.

IN his report on the health of Calcutta during the third quarter of the year 1883–84, Dr. McLeod comments on the peculiarities of the mortality from fever and small-pox. The total deaths from fever numbered 1,025, against a decennial average of 1,579. No year of the preceding ten presented so low an aggregate, and each month's total fell far short of the mean. The usual rise from month to month

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was, however, preserved, and the figures were also, as usual, in progressive excess of those of the preceding quarter. The influences favouring the prevalence and aggravating the type of fever were evidently at a minimum, and as the cold season was an unusually chilly one, the experience of the year tells strongly against the theory which would ascribe fevers in the district to chill. Nor was humidity lacking; for though the rainfall of October and November was scanty, that of December, the coldest month, was in excess, and even in the two former months the humidity of the atmosphere was as high as usual. The figures relating to the mortality caused by cholera are still more remarkable than those referring to fever. Taking the period as a whole, the cholera mortality (350) was moderate. It was below the decennial mean, and five years of the decade show smaller, and five larger figures. The totals of individual months, however, exhibit different relations to past years. The October mortality (162), more than twice the mean, was equalled in its severity by but one year of the series; the December mortality (85) was but little more than half the mean, and had only two better years than it; while the November figure (103) occupied an intermediate position. It fell short of the mean, but the decennial series showed five better years and five worse. The rhythm of the previous year was simply inverted. In 1882 there was a late and very severe cholera; in 1883 an early and mild outbreak. The usual seasonal rise began in the first week of October; the maximum was attained in the third week of that month; the figures of succeeding weeks fluctuated till the third week of December, when a decided improvement became manifest. These features coincided with an early cessation of rain, a very decided fall early in December, followed by unusual cold. Calcutta has not been singular with respect to comparative exemption from cholera. The returns received from the suburbs tell the same tale; and although Dr. McLeod has no figures in his possession to demonstrate the fact statistically, he understands that the surrounding districts have shared in the immunity. On this point he promises to speak more fully in his annual report.

AMERICAN BUTTER.

A COMMITTEE of the New York Senate has recently reported the result of an inquiry into the adulteration of American dairy products. The details are both disgusting and alarming. Of thirty samples of butter, two-thirds were only remotely traceable to milk. The refuse fat of pigs and bullocks was the chief and most savoury ingredient, but often spoiled greases were used, which had been deodorised by nitric and sulphuric acids of a strength sufficient to rot a workman's cowhide boots, to cause the finger nails to drop off, and induce various lingering diseases. The material was also found to contain ingredients which are fatal to infants. The doctors upon oath declared that the consumption of this compound had a distinct bearing upon the death-rate. The committee advises the total prohibition of the manufacture of oleomargarine. The interest on this subject is not merely local, as the exports in February included nearly one million pounds of butter and over three millions of cheese, so that other countries may get their share of these detestable compounds.

DETECTING TRICHINÆ IN MEAT.

THE *American Microscopical Journal* gives the following method for this purpose:—Slices, two or three millimetres in thickness, are taken from several different parts of the meat to be examined. The pieces are preferably taken from the surface of the muscular portion of the meat. A series of thin sections are made of each of the pieces, and these are all plunged into a solution composed of methyl green 1 gramme, distilled water 30 grammes. After about ten minutes' maceration the sections are taken out, and placed to decolorise in a large vessel filled with distilled water. They remain there about half an hour, the water being agitated and changed two or three times. Finally, the water having become quite limpid, it is stirred up with a glass rod, interposing the vessel between the eye and the light, when the sections containing the trichinæ are distinguished quite readily with the naked eye. The trichinæ appear in the form of small, elongated particles, of a fine blue colour. The methyl green becomes fixed to the cysts of the trichinæ with greater tenacity than to other parts of the tissue. It suffices then to examine the sections with a magnification of fifty diameters to distinguish the worm which will be found in the cyst. If, in following this method, no trichinæ are found, it is positive assurance that the meat is not infected with them.

TRICYCLES IN THE PARKS.

THE number of people who ride on bicycles and tricycles is constantly on the increase, and they have become dissatisfied with the manner in which they are permitted to indulge in their favourite exercise. Their dissatisfaction has recently manifested itself in a meeting which was held for the purpose of protesting against the exclusion of tricycles from the parks, and some speeches went so far as to declare that there is at present no law to prevent tricycles going through the parks. Whether such a law should exist is a matter on which there may be a difference of opinion, but that there is power to exclude tricycles from the parks is unquestionable. A tricycle is certainly a vehicle, and some people might call it a machine; and by the Parks Regulation Act of 1872 it is provided that 'no person shall drive or wheel into a park any vehicle, barrow, truck, or machine not admitted therein by the rules of the park.' These rules are defined to be such rules as may in relation to any matter within the jurisdiction of the Ranger of the park be from time to time made by the Ranger; and in relation to any other matter be from time to time made by the Commissioners of Her Majesty's Works and Public Buildings. These rules have, when made, to be laid before both Houses of Parliament; and may be disapproved within a month of being so laid, but if not disapproved have the force of law. Under the above provisions rules have been made for the regulation of the different parks; and the rules in force as regards Hyde Park prohibit certain vehicles from entering the park at all, and restrict other vehicles to particular roads. Among the vehicles which are prohibited altogether are 'velocipedes;' and unless the admirers of the tricycle are prepared to contend that their carriage does not come within the class of vehicles called by the name of velocipede, we cannot see that there can be any doubt as to the law at present in force forbidding the use of tricycles in Hyde Park. Whether the authorities who make the

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rules should alter them so as to admit tricycles is a question fairly open to discussion. There is no doubt that a tricycle is a more manageable vehicle than a bicycle, and less likely to get in the way of other vehicles and cause accidents. There is also no doubt that both bicycles and tricycles are the means of affording recreation and of providing a healthy means of exercise to many people, who would like to use the parks if they could. On the other hand, the parks are very properly reserved as a recreation ground for the people who live near them, many of whom would much prefer the absence of tricycles to their presence. Horses are not so liable to be alarmed at these machines as they were some years ago; but some horses are still frightened at them, and many more nervous people who drive in carriages are apprehensive of the horses becoming restive, when a bicycle or tricycle approaches. Besides this there is the fact to be considered that at certain hours of the day the number of vehicles which are admitted under the existing regulations is already in excess of what the parks can comfortably accommodate, and that, from a purely police point of view, the addition of a large number of other vehicles is eminently undesirable. On the whole, we see no objection to tricycles being admitted to use some of the roads in the parks; but it should be not as a matter of right, but, so to speak, on sufferance, subject to regulations as to time of day, pace of travelling, and other matters which would ensure protection to the persons who use the parks, who ought not to have their enjoyment curtailed for the sake of allowing tricycles to go where now they cannot.

THE DWELLING-HOUSES INSPECTION BILL.

THE supervision and the construction of houses and of their drainage arrangements are at present in a somewhat chaotic state, and it is proposed to add to the difficulty by the introduction of this Bill. In the *metropolis* the district surveyors appointed by the Metropolitan Board of Works supervise more or less strictly the materials used in the construction of houses, the provision of damp-proof courses, the laying of concrete under the whole area of the house, as well as the walls of the house, when built on made ground. The surveyor appointed by the vestries and district boards has power to supervise the construction of, and the material used in, making new drains, as well as the trap-wastes from sinks, basins, &c., so as to prevent the ingress of sewer-air into the houses. The sanitary inspectors appointed by the same authorities have to look after the houses when occupied, to see that no injurious modes of drainage or defective drains are in existence. In *extra metropolitan* districts all these duties are performed by the surveyors to the local sanitary authorities, if there are by-laws in existence; and if not, the 'jerry builder' has his own way, subject only to the examination of the houses, when occupied, by the inspector of nuisances. It is now proposed to add to these officials another, to be appointed by the local authority, subject to the election of the new officer being confirmed by the Local Government Board. This official is to do all the duties now carried out by the above-named officers at present appointed by the local authorities, without any repeal of their powers, so that two or three sets of officers may be engaged in one district in the same work. If he were appointed for districts where there are no by-laws in existence he might be very useful, but to cast the same duties on different persons will lead to great confusion, and most certainly it would be a great error to appoint such officers for the metropolis. In addition, the cost of this officer, 'and his assistants' (no word is said about the appointment or duties of the assistants) would be great, and might be readily met, at any rate so far as the metropolis is concerned, by an extension of the powers already possessed by officers of the Metropolitan Board of Works, the vestries, and district boards. As to districts where by-laws exist, the same result might be obtained by extending their powers, so that it is only rural and urban places where there are no by-laws, or officers appointed to supervise new buildings, that the present Bill would usefully apply. It is, however, just possible that Mr. Monckton did not intend to include the metropolis, as there is no definition of the words 'local authority,' and as by clause 3 it is proposed that the local authority shall have the same powers of appointing inspectors as are given to those under the Public Health Act. Now, as the metropolitan sanitary authorities have no power to appoint inspectors under the Public Health Act (see sects. 5, 189 & 190), they perhaps would not have it under the provisions of this Bill. If so, they should be expressly excluded as in the Act itself, and all uncertainty on this point be thus cleared up.

SUMMER HEALTH RESORTS.

WITH the approach of summer, many of the watering-places are already up and doing. At Blackpool the summer season will this year be opened a month or six weeks earlier than usual, so as to give intending visitors the advantage of enjoying the fine June weather at the sea-coast. The Lancashire and Yorkshire and the London and North-Western Railway Companies have intimated their intention of putting on their summer service of trains on June 1 instead of on July 1, as in former years, and of running them without intermission until after the close of the season. These companies will also run their cheap excursions from all the stations on their lines to Blackpool from Whitsuntide instead of from July, as previously. In connection with this movement, great efforts are being made by the Corporation and the managers of the places of amusement to provide an unusually attractive programme for the earlier weeks of summer, and the month of June more especially. For that month a promenade band will be engaged, which will be selected, one for each week, from the finest bands of Lancashire and Yorkshire, and will be maintained at the expense of the Corporation. At the piers, the theatres, and the other places of amusement, some of the most eminent vocalists and instrumentalists have been engaged, in addition to the leading London and travelling operatic and dramatic companies. A special novelty will be provided at the Winter Gardens in the form of a Manchester Ship Canal Exhibition, which will be on a realistic scale of considerable magnitude, showing all the features of the canal from Manchester to the sea by means of moving scenery, with mechanical bridges, locks, &c., and in connection with which, trips will be taken down the canal on a steamer capable of accommodating 600 passengers. The great employers of labour, who are favourable to the scheme, are taking an interest in this unique exhibition, and have pro-

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mised it their support, one Lancashire firm having undertaken to send 10,000 workmen to witness it. It is expected that the Ship Canal Exhibition will be opened with some ceremony, on Monday, May 26, and that Mr. Adamson, the chairman of the Ship Canal Committee, and many of the provincial mayors, together with consuls and other gentlemen of influence, will be present on this occasion.

THE BIRMINGHAM INFECTIOUS DISEASES HOSPITAL.

THE Birmingham Town Council, at a meeting held on April 1, decided to approve an extensive scheme, prepared by the Health Committee, for the enlargement of the borough hospital for infectious diseases. The duty of the municipal authority to protect the inhabitants of the town from such diseases by providing means for prompt and effective isolation has been recognised and fulfilled only within a recent period. Towards the close of 1871 an epidemic of small-pox occurred in the borough, which continued during the three following years with more or less severity, reaching its height in 1874. The total number of cases reported was between six and seven thousand, and the deaths reached to about one thousand. At that time there was no provision whatever for isolation. It was this epidemic, coupled with representations from the Local Government Board, which gave rise to the Birmingham Borough Hospital. With the co-operation of the Board of Guardians some temporary wooden structures were first put up in a corner of the Workhouse grounds, affording accommodation for about one hundred patients. Two years later the Sanitary Committee submitted proposals for the purchase of two separate properties for the purposes of a small-pox hospital, but sufficient opposition was brought to bear by residents in the respective localities to cause both schemes to be abandoned. The committee then recommended the erection of a temporary building at the cost of 2,000*l.*, and on this being rejected in favour of a proposition to take over from the guardians the buildings already erected on the Workhouse grounds, they resigned. Negotiations were opened with the Board of Guardians, with the result that the buildings and land were leased to the Corporation at 100*l.* annual rental, which was raised five years ago to 250*l.* Since the acquisition of this accommodation by the Corporation three scarlet fever wards have been erected. Altogether the Council has spent 5,420*l.* upon these buildings, exclusive of the rent of the original building. The accommodation is nominally for 110 patients, but as many as 170 have been within the walls at one time. Last year the freehold of four and a half acres of land on Winson Green Asylum Estate was purchased for a sum of 4,500*l.*, for the purpose of erecting a separate scarlet fever hospital. While the plans were under consideration, however, the small-pox epidemic, which spread throughout the Black Country, and became very virulent in some parts, induced the Council to consent to the immediate erection of two pavilions, each to contain two wards. These are both completed, one at a cost of 2,704*l.*, and the other at a cost of 2,602*l.* Each ward measures 60 feet long by 26 feet wide, and 16 feet high, and contains 24,960 cubic feet of air space. But these are not found sufficient to meet the demands for space, and the Health Committee accordingly asked for authority to erect two additional pavilions, with the necessary administrative offices, and to lay out the ground. Up to the present time, the expenditure, exclusive of the price of the land, has been 8,854*l.* The further work for which the Committee has obtained the sanction of the Council is estimated to cost 19,646*l.*, making a total of 28,500*l.* The heaviest item of the estimate is 7,000*l.* for the permanent administrative block. Then there is 5,500*l.* for the two pavilions; engineers' work, 2,155*l.*; erection of a lodge, 425*l.*; 1,600*l.* for a laundry, and 1,431*l.* for furnishing. The committee in their report allowed for 130 beds in four pavilions, which would bring the cost up to 219*l.* per head; but it was considered that, as in many cases of scarlet fever the patients are children, 214 beds would not be too many, which would bring the cost to 130*l.* 16*s.* The chairman of the committee (Mr. Lawson Tait), in proposing the report for adoption by the Council, pointed out that, taking the periods of the scarlet fever wave as five years, the average population of the hospital during that period would not be much over 100, which would give an average amount of cubic space of about 3,000 feet; and it would be only for short periods that the limit of 1,300 cubic feet, which he held to be quite safe, would be reached. He also mentioned that the small-pox hospital had been so full as to allow only 900 cubic feet per patient. Last year the maintenance of the small-pox hospital, which received 1,103 patients, and the one pavilion of the scarlet fever hospital then in use, in which 638 patients were treated, cost 4,345*l.* 11*s.* 9*d.* Considerable opposition was made to the adoption of the report on account of the expense of the proposed buildings and the large sum proposed to be laid out, and an amendment was proposed that, before so large an outlay was sanctioned, further inquiry should be made, and the Local Government Board consulted on the subject. This amendment was rejected by thirty-nine votes to eighteen.

POISONOUS FUNGUS IN DRIED COD.

MONSIEUR E. BERTHERAND contributes an interesting paper on the above subject to the *Journal de Médecine et de Chirurgie de l'Algérie.* Distressing gastro-intestinal disturbance was set up in persons after partaking of dried cod which on section presented a vermilion red colour, the colour being most marked in the flesh round the spine. The symptoms were acute pain in the stomach, bilious vomiting, diarrhœa, tenesmus, collapse, intense thirst, dysphagia, acid taste in mouth, a sensation of burning along the œsophagus, general cramp and coldness of the extremities. The author and one of his colleagues were attacked, the symptoms in these cases resembling those of cholera. He draws attention to the five cases in St. Petersburg, cited by Hermann, in which toxic symptoms followed the ingestion of diseased dry salted cod, two terminating fatally; and to the account of a wholesale poisoning from the same cause given by Dr. Schaumont in the *Recueil des Mémoires de Médecine Militaire*, in which 122 men suffered and 17 had to be sent to hospital, all however recovering (April 1878). M. Mégnin, to whom M. Bertherand submitted specimens of the diseased cod, found that the vermilion colour was due to the presence of a mould of the 'genre' *coniothecium*, belonging to the protomicetes, to which he proposes to give the name *coniothecium Bertherandi.* Some dogs and rabbits to which portions of the vermilion

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cod were given were not affected. M. Bertherand suggests that the red fungi may merely indicate a toxic modification in the flesh of the cod, and not be themselves poisonous. This may be so, and it is exceedingly probable that the flesh of the fish first undergoes a distinct change, fitting it to support the new life. However, even assuming this, it is still a question whether fungi developed on a soil already hurtful do not themselves become hurtful by acquiring toxic properties not normal to them. In any case it behoves all those who use salt cod to examine it carefully for any indications of a bright red fungus, and to destroy any portions of fish which may be infected. It is hardly necessary for us to insist upon the importance of having salt fish thoroughly cooked. Cooking is a good aid to digestion no less than a good germicide, and the symptoms of acute dyspepsia are scarcely less serious than those of fungus poisoning.

THE PUBLIC HEALTH

During March 1884.

The mean temperature at the Royal Observatory, Greenwich, during the month of March was 43°·5; it exceeded by 2°·9 the average March temperature in one hundred years, and was 7°·4 above that recorded in the corresponding month of 1883. An excess of temperature prevailed on twenty-one days of the month, while on the other ten days it was below the average. The coldest day of the month was the 1st, when the mean was 35°·1, and 5°·2 below the average; the warmest day was the 15th, when the mean was as high as 56°·5, and showed an excess of 15°·4. Rain was measured at Greenwich on eleven days during the month, to the aggregate amount of 1·4 inches, which was one-fifth of an inch below the average March rainfall in sixty-one years. During the first three months of this year the rainfall amounted to 4·7 inches, which was 0·3 of an inch below the average rainfall in the same period of sixty-one years. The sun was above the horizon during 366·9 hours during March, but only 85·8 hours of bright sunshine were recorded at Greenwich. This amount was very considerably below the average in the corresponding periods of the five preceding years 1879–83. South-westerly winds prevailed during the first three weeks of March, while from the 24th to the end of the month the wind was easterly.

In the twenty-eight large English towns, dealt with by the Registrar-General in his Weekly Return, which have an estimated population of nearly eight and three-quarter millions of persons, 24,308 births and 14,773 deaths were registered during the four weeks ending the 29th ult. The birth-rate, which had been 31·7, 34·9, and 35·3 per 1,000 in the three preceding months, further rose to 36·2 during March, and exceeded by 1·2 per 1,000 that recorded in the corresponding period of last year. In these twenty-eight towns the lowest birth-rates last month were 27·2 in Huddersfield, 29·2 in Halifax, and 30·6 in Bradford; in the other towns the rates ranged upwards to 43·1 in Nottingham, 45·3 in Sunderland, and 46·6 in Cardiff. The birth-rate last month in London was 35·4, while it averaged 36·8 per 1,000 in the twenty-seven provincial towns.

The annual death-rate in the twenty-eight towns, which in the four preceding months had steadily declined from 22·6 to 20·5 per 1,000, rose again to 22·0 during the four weeks of March, but was below that recorded in these towns in the corresponding periods of the two preceding years 1882–83, when it was 23·4 and 26·1 per 1,000 respectively. During the first quarter of this year the death-rate in these twenty-eight towns was only 21·1 per 1,000, a lower rate than has been recorded in these towns in any preceding corresponding quarter, the nearest approach to so low a rate being in 1883, when it was 23·8 per 1,000. The lowest rate of mortality last month in these towns was 17·0 per 1,000 in Derby. The rates in the other towns, ranged in order from the lowest, were as follow:—Brighton, 17·2; Bradford, 18·6; Bristol, 18·8; Cardiff, 19·5; Plymouth, 19·7; Birkenhead, 20·1; Leicester, 20·5; Birmingham, 20·8; Hull, 20·9; London, 21·0; Sheffield, 21·2; Huddersfield, 21·2; Norwich, 21·4; Wolverhampton, 22·1; Portsmouth, 22·5; Sunderland, 22·8; Nottingham, 23·1; Newcastle-upon-Tyne, 23·2; Salford, 23·6; Bolton, 23·6; Liverpool, 24·4; Leeds, 25·3; Blackburn, 26·2; Halifax, 27·1; Manchester, 28·7; Oldham, 28·9; and the highest rate during the month 29·9 in Preston. While the death-rate in London during March, as above stated, did not exceed 21·0 per 1,000, it averaged 22·9 in the twenty-seven provincial towns. The 14,773 deaths from all causes in the twenty-eight towns during the four weeks of March included 1,908 which were referred to the principal zymotic diseases, of which 595 resulted from whooping-cough, 530 from measles, 336 from scarlet fever, 158 from 'fever' (principally enteric), 136 from diarrhœa, 93 from diphtheria, and 62 from small-pox. These 1,908 deaths were equal to 12·9 per cent. of the total deaths, and to an annual rate of 2·84 per 1,000. This zymotic death-rate showed an increase upon the rates in the four preceding months, which had steadily declined from 2·81 to 2·46 per 1,000. The death-rate in London from the principal zymotic diseases during March was equal to 3·0 per 1,000, and slightly exceeded the average rate in the twenty-seven provincial towns, among which this zymotic rate ranged from 0·3 in Plymouth, 0·7 in Bradford, and 0·8 in Bristol, to 4·0 in Nottingham and in Leeds, and 5·4 in Portsmouth and in Oldham. Measles caused the high zymotic death-rates in Nottingham, Portsmouth, and Oldham, and scarlet fever in Leeds.

Whooping-cough, as in the first two months of the year, was the most fatal zymotic disease in the twenty-eight towns during March. The rate of mortality from this disease, which in the five preceding months had increased from 0·26 to 0·73 per 1,000, further rose to 0·89 during March, and considerably exceeded the rate in the corresponding month of 1883, which was 0·70 per 1,000. In London the death-rate from whooping-cough was as much as 1·37 per 1,000, and was nearly three times as fatal as in the provincial towns, among which it averaged only 0·48 per 1,000, but was equal to 0·86 in Newcastle-upon-Tyne, and 0·98 in Liverpool. The death-rate from measles, which in the three preceding months had been 0·69, 0·57, and 0·46 per 1,000, rose again during March to 0·79; the rate of mortality from this disease in London was 0·69 per 1,000, while in the twenty-seven provincial towns it averaged 0·87, and was equal to 2·54 in Nottingham, 4·25 in Oldham, and 4·51 in Portsmouth. The rate of mortality from scarlet fever, which had declined from 0·84 to 0·52 in the four preceding months, further fell to 0·50 during March, although it exceeded the rate from this disease in the corresponding period of either of the two preceding years. In London the death-rate from scarlet fever did not exceed 0·34 per 1,000, while it averaged 0·63 in the provincial towns, and was equal to 1·55 in Newcastle-upon-Tyne, 1·87 in Sheffield, and 2·07 in Leeds. The last-mentioned town has, for the last eight months, shown the highest rate of mortality from scarlet fever. The death-rate from 'fever' (principally enteric or typhoid) was equal to 0·24 per 1,000, and showed a slight increase upon the declining rates in recent months, but was considerably below the rate in the same period of either of the two preceding years. In London the fever-rate last month was equal to 0·23 per 1,000, and almost corresponded with the average rate in the provincial towns, which was 0·24, but was equal to 0·86 in Newcastle-upon-Tyne, and 0·98 in Liverpool. The rate of mortality from diarrhœal diseases was below the average of corresponding months in recent years. The death-rate from diphtheria in the twenty-eight towns,

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which had been 0·21, 0·18, and 0·19 in the three preceding months, declined during March to 0·14, a lower rate than has been recorded in any month since the middle of last year; this disease is still much more fatal in London than in the provincial towns; it caused during last month 9 deaths in Leeds, and 6 in Birmingham. During the four weeks of March 62 fatal cases of small-pox were registered in the twenty-eight towns; of these, 26 occurred in London, 14 in Sunderland, 9 in Birmingham, 9 in Liverpool, 2 in Newcastle-upon-Tyne, 1 in Wolverhampton, and 1 in Sheffield. During the first three months of this year as many as 54 deaths from small-pox have been recorded in Birmingham, and 52 in Sunderland. Judged by the returns of the Metropolitan Asylum Hospitals, the prevalence of small-pox in London showed during March a very considerable increase; the number of small-pox patients under treatment in these hospitals, which in the five preceding months had steadily risen from 41 to 132, further rose to 264 at the end of March, and exceeded the number at any period since June 1882. The average weekly number of new cases admitted to these hospitals, which had been 23, 18, and 21 in the three previous months, rose to 52 during March.

The rate of infant mortality in the twenty-eight towns, measured by the proportion of deaths under one year of age to births registered, was equal to 143 per 1,000 during March, which was considerably below the rate recorded in these towns in the corresponding month of either of the two previous years. In London the rate of infant mortality did not exceed 137 per 1,000, and was 11 per 1,000 below the average rate in the twenty-seven provincial towns, among which it ranged from 93 in Portsmouth and in Sunderland, to 192 in Manchester, 197 in Blackburn, and 217 in Oldham.

The death-rate from diseases of the respiratory organs, judged by the metropolitan returns, continued much below the average throughout the month of March. The weekly number of deaths referred to these diseases in London averaged 372, and the annual death-rate did not exceed 4·8 per 1,000, against 5·8 and 7·3 in the corresponding months of 1882 and 1883. The annual rate of mortality from these diseases in Liverpool last month was equal to 5·8 per 1,000.

The causes of 377 of the 14,773 deaths registered in the twenty-eight towns during the four weeks of March were not certified, either by registered medical practitioners or by coroners. These uncertified deaths were equal to 2·6 per cent. of the total deaths, against 2·6 and 2·4 in the first two months of the year. The proportion of uncertified deaths in London did not exceed 1·4 per cent., whereas it averaged 3·4 in the twenty-seven provincial towns, among which the proportions ranged from 1·3 in Norwich and in Birmingham, to 6·3 in Oldham, 6·9 in Halifax, and 9·0 in Wolverhampton.

Among the population living in the outer ring of suburban districts around London, estimated at rather more than a million persons, the annual death-rate from all causes during March was equal to 17·3 per 1,000, against 19·2 and 20·0 in the corresponding periods of 1882 and 1883. During the four weeks ending the 29th ultimo, 77 deaths from whooping-cough, 30 from measles, 23 from diphtheria, 18 from scarlet fever, 12 from 'fever' (principally enteric), 4 from diarrhœa, and 4 from small-pox, were recorded in the outer ring. These 175 deaths from the principal zymotic diseases were equal to a rate of 2·1 per 1,000, which corresponded with the rate in the previous month. The fatality of measles and whooping-cough showed an increase, while that of 'fever' showed a considerable decline. In the district of West Ham, 15 fatal cases of whooping-cough, 14 of measles, 7 of scarlet fever, 7 of diphtheria, 6 of fever, and 2 of small-pox, were recorded during the month. A death from small-pox occurred in Hornsey sub-district, and one in Sunbury sub-district; and 10 fatal cases of whooping-cough were returned in the district of Brentford.

SPECIAL REPORTS.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the society was held at 1 Adam Street, Adelphi, on Friday, March 21; Dr. T. O. Dudfield in the chair.

The Council presented a report upon a letter from the Duke of Buckingham, chairman of the Executive Committee of the Health Exhibition, which had been received by the president. The president explained that the purport of this letter was to invite the society to hold a series of conferences at the Exhibition on health subjects, and that the Council proposed that there should be six such conferences, to be held in the week beginning June 23, and that the Council proposed to make the necessary arrangements. The action of the Council was approved.

OFFENSIVE BUSINESSES.—The president called attention to the appeal case, 'Passy (appellant) *v.* Oxford Local Board (respondents),' in which the late Lord Chief Justice Cockburn and Mr. Justice Lopes had upheld the decision of the magistrates at a petty sessions at Oxford, that the business of the appellant—a bone and rag merchant—carried on by him at Oxford, was, as a matter of fact, a noxious and offensive one; and, as a matter of law, was of the same character as the six trades specified in sect. 112 of the Public Health Act, 1875. He argued, therefore, that the said business was of the same character as the trades enumerated in sect. 3 of the Slaughter Houses (Metropolis) Act, 1874; and gave reasons for the opinion that the business of a rag and bone merchant should be scheduled and regulated under that section, and come under by-laws as the only effectual way of preventing recurring nuisances. He added that the local authority (Metropolitan Board of Works) had declined to schedule the business on the application of the Kensington vestry, on the ground that 'the businesses to which the Act of 1874 refers are businesses which include processes of manufacture of a more or less offensive character, and that it did not appear to the Board that the mere collection of a mass of refuse matter into one place was a "business" within the meaning of sect. 3 of the Act.' But in the Oxford appeal case the judges had arrived at a different conclusion, deciding that a 'business in order that it may be brought within sect. 112' of the Public Health Act, 1875, 'should be *ejusdem generis* with those specified in that section' (which is practically identical as to the businesses therein mentioned with sect. 3 of the Slaughter-Houses Act). 'Those businesses,' the Lord Chief Justice said, 'seem to include animal matter in some form; and here there was animal matter, with the bones stored on the premises, and the mere exposure of bones with animal matter may be very offensive.' The President remarked that in addition to 'bones' and other forms of animal matter, at many of these shops large quantities of fat, often in a foul and offensive condition, were collected prior to removal to the fat melters, where the regulations require it to be so stored as not to be a nuisance by escape of offensive effluvia into the open air; and he urged that if the business of a bone and rag merchant were regulated by by-laws, all offensive matters would have to be so stored that they could not become a cause of nuisance. Moreover, if nuisance did arise, it would only be necessary to prove breach of the by-law, and the offender would be fined, whereas, under the Nuisances Removal Acts, needless difficulties arose, and it was found practically impossible to prevent the frequent recurrence of cause of complaint.

Mr. Spencer stated that in deciding not to declare the business of a marine store dealer an offensive business under the third section of the Slaughterhouses, &c., (Metropolis) Act, 1874, the Metropolitan Board of Works had probably been mainly influenced by the fact that the nuisance complained of arose from accumulations of

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offensive material, and not from the carrying on of any trade process. The businesses named in the Act, including those of bone boiler and tallow melter, mentioned by Dr. Dudfield, involved the carrying on of trade processes producing offensive effluvium, and the object of the Act was to secure that those processes should be carried on without nuisance. The trades which had already been declared offensive under the section, such as the manufacture of glue and size, the drying of blood, the scraping and manufacture of gut, &c., all include one or more processes causing nuisance of manufacture. The nuisance complained of in connection with marine store shops arose from the collection of stale fat and bones, and the decision in the case Passy *v.* the Oxford Local Board, referred to by Mr. Dudfield, while settling the point that the business was *ejusdem generis* with the businesses named in the Public Health Act, did not in any way touch the question whether or not it was desirable to declare it an offensive business in order to deal with it by by-law. There were serious practical difficulties in such a course; such, for instance, as the definition of what constituted a business, for probably there was hardly a household in which fat and bones were not collected to some extent. The Nuisances Removal Act appeared to give ample power for dealing with nuisances of this character, when judiciously and persistently enforced; but if medical officers generally agreed that the power given by the Nuisances Removal Acts was insufficient, and if a strong case could be made out for dealing with the business in the way suggested by Dr. Dudfield, it might be well to ask the Metropolitan Board of Works to reconsider the matter, but it would probably be useless to again raise the question unless there was general agreement backed by strong evidence.

Dr. Dixon pointed out that some difficulty would necessarily attend a decision as to the number of bones which would come to constitute a trade. There were a large number of shops receiving very small quantities of bones from private houses. He thought the subject best dealt with under the Nuisance Removal Act.

Dr. James Stevenson said that the delay in the collection of the bones was the main difficulty, and that if the more speedy removal could be enforced there would be less opportunity for nuisance to arise.

Mr. G. N. Fosbroke read a paper on SOME SUSPICIOUS CASES OF COPPER POISONING, which is published on page 484.

DISCUSSION.

In the discussion which ensued, Professor Gardner observed that copper vessels are usually lined with tin, and are then the best for cooking purposes, but when not so lined become dangerous when free acids are eliminated, or when exposed to grease and air.

Mr. Wynter Blyth asked whether the patients had a green line round the gums. Corroded copper would be readily attacked by broths which are acid, and thus poisoning results; but he was rather sceptical as to the injurious effects of vegetables coloured with copper.

CURSORY REMARKS ON THE MANUFACTURE OF WHITE LEAD, AND ITS EFFECTS ON HEALTH. By F. M. CORNER, M.R.C.S.

My mention at a meeting of this society on Jan. 18 of two fatal cases of lead poisoning which came to my knowledge elicited from our President the request that I should supply further details, as the matter was of considerable importance and interest. (SANITARY RECORD, Feb. 15, p. 401.)

The two cases occurred about the same time, and were those of women, both of whom had worked in the same factory.

The first was a girl, whose age at her death was 18 years and 3 months. She was described in a note made towards the end of November as cleanly in her appearance, with colour in her cheeks, and in good health; the only sign of plumbism being a slight blue line on the margin of the gums. She had been working on and off at the factory for twelve months. In the autumn she worked in the hop-fields, returned home in September, and resumed factory work in the middle of October. Her mother and sister, who work in the same factory, state that she had always enjoyed good health, had never suffered from symptoms of lead poisoning, and on the morning of her last visit to the works she appeared as well as ever. At breakfast time she was taken in a fit, and removed to hospital, her condition on admission being rather puzzling. She appeared unable to give any description of her feelings, and her behaviour was more suggestive of hysteria than anything more serious. The interval between her admission and death was four days, during which she never recovered consciousness, had several slight epileptic attacks, and appeared to have died in one.

At the time of her being taken ill she had been working in the white bed, unstacking the bed, on the completion of the process of white lead formation. An autopsy revealed no changes in the nervous system, and in the large bowel only some slight discoloration.

The second case was that of a married woman, between 30 and 40, of delicate constitution, who had had two children, and had been engaged in the lead work about ten months. After four months she was obliged to stay away for a fortnight from sickness, constipation, pain in the chest, and giddiness. In September she again suffered from giddiness, faintness, pains in the head, and loss of appetite, and was advised not to continue the work. In October she reported herself better, and continued her work. In November she gave a like report, but was remarked on as 'pallid.' The following month she had been taken into hospital suffering from plumbism, having foul tongue and breath, the lead line on the gums, occasional but severe colic vomiting, and slight loss of power in the right wrist. There were also symptoms indicating disturbance of brain similar to, but rather more severe than, those previously suffered. Four or five days before her death she had in the night a fit, of only a few minutes' duration, but which, from the nurse's description, was epileptic in character. Other attacks followed, and in the end coma and death. At the autopsy absolutely nothing was found except some staining of intestine; but an analysis of the viscera discovered in the liver 3·5 grains of lead, but more in the nervous system. There was a close similarity in the nerve symptoms in the two cases. In both, the convulsive attacks, while in hospital, were slight; both occurred in the night and were only observed by the nurse.

In the first case it would seem that no amount of inspection could have detected the near approach of fatal symptoms as no premonitory warnings appear to have occurred.

In the second there had been evidence of brain disorder, but the woman had recovered, and nothing in her condition when seen about a month before the fatal illness suggested that she should be advised to discontinue her work.

The common effects on nearly all the employés in white lead factories—nearly all of whom are women—are a general failure of health, as evidenced by their pale complexions, loss of appetite, pain in the pit of the stomach, aggravated often by food, constipation, colic pains in the limbs, paralysis, more particularly of the extensors of the wrist and hand, sometimes of the muscles of expression, and the deadly effects of the poison on the nervous system, ending in convulsions and coma. It is a common practice for these women to absent themselves when feeling ill for a few days—weeks—months—generally taking active aperient medicines. Some continue work to the full period of utero-gestation and during suckling, and in answer to questions, appear not to have suffered from the habit. I have not met with confirmation of the opinion that lead-poisoning leads to abortion, but I have been struck with the large proportion of childless married women.

The process of manufacture appears almost identical in the larger manufactories, and may be briefly given in illustration of the dangers to health under which the em-

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ployés work, in spite of every care on the part of the employers, and the well-intentioned regulations made obligatory under the Factory and Workshop Act, 1883.

The melted metal is lifted in ladles from a cauldron and run into shallow moulds, setting almost instantly, and is then taken to a chamber to be stacked. The stack is formed first by a layer of tanners' bark, upon which are placed rows of earthen pots filled with vinegar; over these are ranged the moulds of lead, and layer on layer of these are built up, until the chamber is nearly filled. Building up the stack is known as working in the blue bed.

The removal of the stack, generally after three months, when the lead is found largely converted and encrusted with white lead, is termed working in the white bed. The stack is carefully taken to pieces by the hands of women, water being sprinkled about for the purpose of lessening the rising of the white lead dust. The white lead frames are carried in trays, generally on the heads of the women to the water tanks, in which they are raked over and the white lead detached from the unconverted metal. It is then ground either in the wet state, during which no dust is generated, or in the dry state, when much dust is diffused.

For the purpose of drying the wet, salt is put into ware dishes and placed on shelves in the stoves, being submitted to a dry heat at a high temperature.

The next step (after about three weeks) is the drawing of the stove, the dishes being handed down from the shelves and passed from one woman to another, forming a line of workers, to the bin or barrels into which the contents are turned.

It is believed that little or no danger attends the handling of the blue metal or lead, and that the first serious danger is experienced in the removal of the stack or the white lead, the act requiring provision of a respirator for the mouth and nostrils to every person so occupied. Unfortunately the work is heavy, heating, and dusty, and scarcely a woman can submit to wear the respirator. It shuts out the air, causes greater heat and fatigue, has to be frequently removed by hands covered with white lead dust to allow of their spitting out the saliva impregnated with dust, which otherwise must be swallowed. In practice it is generally seen round the neck, and not on the mouth or nostrils, the women preferring to keep the mouth closed as much as possible, and to spit out without hindrance.

The same remarks will apply to the work of drawing the stoves and the conveyance and deposit of the dry white lead in the bins and casks. It is a department in which there is considerable muscular exertion, and during which the respirator cannot be worn, but the overall and head covering also provided under the Act can be and are used.

At the tanks the hands and arms become covered with white lead deposit left after drying off of the water.

An overall and head cover are required by the Act, and I cannot give any opinion on the effect to health of the exposure of the hands and arms.

The weak points in the present system of manufacturing white lead are the great amount of manual work, the exposure of the workpeople—nearly all women—to an atmosphere largely charged with white lead dust, and, in separating the salt from the lead frames, the exposure of the hands and arms to the same poison whether dry or suspended in water.

The regulations under the Factory Act have, I believe, produced habits of greater cleanliness, and some benefit has resulted from the use of overalls and head covers, but the use of the respirators has been found impracticable.

Until an improved method of manufacture is substituted for the one now in use, my opinion is that none of the so-called safeguards against injury to health will avail much, and that we shall still have in the operatives the general run of complaints so often met with, and the occasional, though I suspect not very rare, instances of death from poisoning of the nervous centres.

That white lead can be manufactured otherwise and in large quantities is shown by the electric process seen at Professor Gardner's works, Deptford, in which the aim has been to save time, to dispense with manipulation and washing of the white lead, to save pollution of air by white lead dust. All these points are asserted as having been achieved, but the commercial success has, I believe, yet to be proved.

I have been over the works and had the general process explained.

The aims are what all sanitarians will approve, and I hope the coming International Exhibition will allow of this and other improvements in the manufacture of white lead being illustrated.

Professor Gardner described his process of manufacture of white lead by which one-sixth of the time occupied by other methods is saved, and the creation of dust avoided. (Vide SANITARY RECORD, Oct. 15, 1883.)

Mr. Wynter Blyth then asked if the author of the paper had noticed any signs of mental weakness among workers in lead factories. About the year 1830, Tanqueril had described an affection called '*Lead encephalopathy*,' and recently the English chemists, especially Dr. Rayner, of Hanwell, had called the attention of the profession to lead as a factor in the causation of insanity. Mr. Wynter Blyth had been afforded the opportunity of seeing at Hanwell several cases in which the cause of the disease either remotely or directly was supposed to be '*lead*.' All the cases were characterised by illusions of the senses; especially of sight and hearing. He would also like to ask whether any effect either in parturient women had been observed, or in the subsequent life of the offspring.

Mr. Corner briefly replied, and stated that he had not observed the appearance indicated.

The Society then adjourned.

INTERNATIONAL HEALTH EXHIBITION, 1884.

THE great interest manifested in this Exhibition is shown by the fact that application has been made, by British exhibitors alone, for space five times as great as that actually at the disposal of the executive council. A portion of the educational section of the Exhibition will be located in the Central Institute of the City of London Technical Guilds, the handsome building in course of erection in the Exhibition Road, which has been kindly placed at the disposal of the executive council. The Royal Albert Hall with its musical attractions will now form an integral part of the Exhibition; and the Aquarium, a popular feature of the late Fisheries Exhibition, will continue as an important part of the Health Exhibition. In the dress section the most popular exhibit will probably prove to be a series which is being prepared, illustrative of English dress of all ranks of life, from the time of the Conquest to George IV. While the main objects of the Exhibition—which are to impart instruction on the principal sections of the undertaking—have received the fullest attention from the executive council, the amusement of the visitors has not been overlooked. The band of the Grenadier Guards, under the able conductorship of Mr. Dan Godfrey, will perform each day: and, actuated by the success which attended the visit of the Thuringian Regimental Band to the Fisheries Exhibition, the executive council have taken such steps as may, it is hoped, lead to the visit of representative foreign military bands this summer. It is also intended that concerts shall from time to time be given in the Albert Hall. An international congress on education will be held, and conferences and lectures will conduce to the elucidation of the subjects of the Exhibition. It is also proposed to have a library and reading room in connection with the Exhibition, which will be open to all visitors, under proper regulations, while the Exhibition is open. The library will consist of books on various subjects comprised in the classification of the Exhibition, both English and foreign. Applications have been addressed to

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foreign and colonial Governments, asking them for copies of reports and statistics on sanitary and educational matters, and a circular is being sent out to authors and publishers requesting them to contribute works of a similar character.

The following handbooks are being written :—'Healthy Villages,' illustrated, by H. W. Acland, C.B., M.D., F.R.S. 'Healthy Bed-rooms and Nurseries,' including the Lying-in-Room,' by Mrs. Gladstone. 'Healthy and Unhealthy Houses in Town and Country,' illustrated, by Mr. W. Eassie, C.E., with an Appendix by Mr. Rogers Field, C.E. 'Healthy Furniture and Decoration,' illustrated, by Mr. R. W. Edis, F.S.A. 'Healthy Schools,' by Mr. Charles Paget, M.R.C.S. 'Health in Workshops,' by Mr. J. B. Lakeman. 'Manual of Heating, Lighting, and Ventilation,' illustrated, by Captain Douglas Galton, C.B., F.R S. 'Food,' by Mr. A. W. Blyth, M.R.C.S. 'Principles of Cookery,' by Mr. Septimus Berdmore. 'Food and Cookery for Infants and Invalids,' by Miss Wood, with a Preface by R. B. Cheadle, M.D., F.R.C.P. 'Drinks, Alcoholic,' by John L. W. Thudichum, M.D., F.R.C.P. 'Drinks, Non-Alcoholic and Aërated,' by John Attfield, Ph.D., F.R.S. 'Fruits of all Countries,' illustrated, by Mr. W. T. Thiselton Dyer, M.A., C.M.G. 'Condiments, including Salt,' by Rev. J. J. Manley, M.A. 'Legal Obligations in respect to Dwellings of the Poor,' by Mr. Harry Duff, M.A., barrister-at-law, with a Preface by Mr. Arthur Cohen, Q.C., M.P. 'Moral Obligations of the Householder. including the Sanitary Care of his House,' by G. V. Poore, M.D., F.R.C.P. 'Laboratory Guide to Public Health Investigation,' illustrated, by W. W. Cheyne, F.R.C.S., and W. H. Corfield, M.D., F.R.C.P., M.A. 'Physiology of Digestion and the Digestive Organs,' by Professor Arthur Gamgee, F.R.S. 'Fermentation,' by Dr. Duclaux, with a Preface by M. Louis Pasteur, membre de l'Institut. 'Spread of Infection,' by Mr. Shirley F. Murphy. 'Fires and Fire Brigades,' illustrated, by Captain Eyre M. Shaw, C.B. 'Scavengering and other such work in Large Cities,' by Mr. Booth Scott. 'Athletics, Part 1, illustrated, by Rev. E. Warre, M.A. 'Athletics,' Part 2, by Hon. E. Lyttleton, M.A., and Mr. Gerard F. Cobb, M.A. 'Dress in relation to Health and Climate,' illustrated, by Mr. E. W. Godwin, F.S.A. 'The Ambulance,' illustrated, by Surgeon-Major Evatt, M.D., A.M.D. 'The Influence of Schools of Art on Manufacturing Industry,' by John Sparkes. 'The Homes of the Poor,' author not yet settled.

REPORT OF THE MANSION HOUSE COUNCIL ON THE DWELLINGS OF THE POOR.

We learn from the monthly report presented to the Council on March 24, that the number of local committees at work has increased from eighteen, as stated in the SANITARY RECORD for March 15, p. 454, to twenty-three, viz.:—West Marylebone, East Marylebone, Central Paddington, South Paddington, Lambeth, Hampstead, Whitechapel, St. George's-in-the-East, Bishopsgate, North Holloway, North Marylebone, Clapton, Holborn, Limehouse, East Greenwich, St. Pancras, St. James's, Westminster, and St. Ann's, Soho, Camberwell, Stoke Newington, Fulham, North Kensington, Brixton, St. Luke's, and Clerkenwell.

In addition to these, the following are expected to commence operations very shortly, preliminary steps having been already taken for their formation, viz.: —West Greenwich and Deptford, Central Kensington, Bermondsey, Mile End Old Town, Bloomsbury and St. Giles, Islington, Pimlico, Hoxton, and Shoreditch.

The general duties of local committees are—to receive complaints regarding sanitary defects and to deal with them.

The following are some of the points to which attention is paid :—Overcrowding; ventilation ; the supply of water, and the state of cisterns ; the character of the privy accommodation; the drainage ; the state of dust-bins and the removal of dust ; accumulation of manure, filth, or trade refuse ; the state of chimneys ; whitewashing and papering ; damp ; holes in roofs or floors ; the removal of infectious cases ; disinfection after infectious illness ; the sites, foundations, and character of new buildings. To inform householders, tenants, and others of the powers which they possess, and the duties incumbent on them under the existing sanitary laws. To show how infectious disease and its extension may be prevented, the advantages of isolation and disinfection, and the means by which these may be obtained. To notify to the Central Sanitary Aid Committee all inquests in which it appears that the condition of the dwelling has been in question as possibly related to the cause of death. To co-operate with such members of vestries and district boards and their officers as take an interest in sanitary work, with a view to helping and facilitating their action in working the provisions of the sanitary laws. To communicate with School Board visitors, and other workers in the district, so that the Local Sanitary Aid Committees may form centres of reference for the notification of sanitary defects, and of the existence of cases of dangerous infectious disease. To watch all building operations in the district, with a view to insuring that those provisions of the Building Acts are carried into effect which relate to the proper construction of houses and the preservation for each house of the amount of open space which the Act requires. To watch for and promote opportunities for converting disused burial-grounds and other areas into open spaces for the use and recreation of the people. The expenses of the local committees are for the most part borne by the Mansion House Council, who supply all necessary material, in shape of circulars, forms, books, and maps free of cost.

SMOKE ABATEMENT.

At a meeting of the managing committee of the National Smoke Abatement Institute, Sir Frederick Pollock, Bart., presiding, it was resolved to conclude an arrangement with the Parkes Museum for space to be provided in the museum for a collection of heating, cooking, and smoke abating apparatus of various kinds, and intended for either domestic or industrial purposes. Ventilating apparatus combined with heating apparatus or otherwise, as well as fuel and gas burners will be included in the collection. The heating apparatus will be selected with the special view of showing typical kinds of apparatus and illustrating systems of economising fuel and abating smoke. No charge will be made to the persons whose articles are exhibited. The public are admitted to the museum free during a portion of every day. The library of the museum, to which the public are admitted by a member's order, contains the illustrated and descriptive report of the tests of grates, stoves, and furnaces made by the Smoke Abatement Committee, as well as a large and valuable collection of medical and sanitary reports, and other works of reference. Persons having specimens of apparatus, diagrams, models, statistical matter, or other articles suited to the collection, or new inventions which they desire to bring to the notice of the council, are requested to communicate with Mr. E. White Wallis, Secretary to the National Smoke Abatement Institution, at the offices of the Institute, which are now to be removed to the Parkes Museum, 74A Margaret Street, Regent Street, W.

LIVERPOOL ENGINEERING SOCIETY.

SHONE'S EJECTORS.

At the fifth sessional meeting of this Society, the president, Mr. R. R. Bevis, jun., in the chair, a paper entitled 'Compressed Air in connection with Sewerage Works' was read by Mr. T. Longdin.

The author commenced his paper by pointing out

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hat, owing to the rapid increase of population in this country, it has become the duty of all authorities having the carrying out of the Public Health Acts to provide good and sufficient sewers to carry away the liquid residuals from their districts. In designing schemes of drainage many difficulties met the engineer to prevent his obtaining those gradients which are absolutely necessary to permit rapidity of movement of the sewage, but this can be overcome by the application of 'Shone's Ejectors' which have for their motive power compressed air, which can be conveyed in iron mains to any part of the town or district, where ejectors receiving the sewage would be placed, working automatically, and accommodating themselves to the flow of the sewage. By this means difficulties caused by the physical outline of any town or district may be overcome, and gradients got which will permit of those velocities being obtained which are requisite to keep the sewers free from deposit.

SANITARY ASSURANCE ASSOCIATION.

AT the third annual meeting of this association, held at the offices, 5 Argyll Place, Regent Street, Dr. George Danford Thomas in the chair, Mr. Joseph Hadley, the secretary, read the annual report and balance sheet for the year 1883, in which the council explain that after the experience of three years they have made such alterations in the details of their work as have enabled them to reduce the charges for houses in London and in the country. In London the minimum fee for inspection and report is now one guinea, and the maximum six guineas. The maximum fee for country houses is also six guineas, with travelling expenses extra. The property inspected during the year has varied in rateable value from 10*l.* to 1,000*l.*, and in every case of property placed on the assurance register for the first time the sanitary arrangements have been found to be more or less defective, but the annual inspections have shown that houses certified by the association have remained in perfect sanitary condition.

Dr. Norman Chevers, C.I.E., and Captain Douglas Galton, C.B., F.R.S., members of the honorary council, have given free public lectures for the association during the year. A special committee has been appointed to consider whether a measure should not be introduced into Parliament 'for compelling builders of all new dwellings to obtain a certificate from some authority or qualified person as to the sanitary condition of such dwellings before it shall be lawful for them to be inhabited.' (See p. 500.)

Dr. James Stevenson, medical officer of health for Paddington, has succeeded Professor Corfield as medical officer to the association.

The association has become self-supporting, and the council anticipate that in future its progress will be greater than it has been in the past. After allowing for all liabilities the accounts show a balance in favour of the association. The chairman said that after carrying on the association for three years the council were so satisfied with the result, especially with regard to the granting of sanitary certificates, which they had initiated in 1880, that they had carefully revised the detail of their work, and that they entered upon their fourth year with every confidence in the continued prosperity and usefulness of the association.

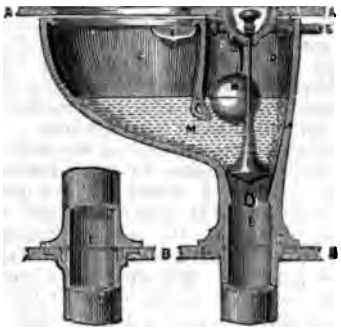
Mr. Barrington Kennett, of the Metropolitan Asylums Board, expressed a hope that the association would assist to promote the success of the International Health Exhibition. Mr. George Aitchison, A.R.A., F.R.I.B.A., and Professor F. de Chaumont, M.D., F.R.S., were re-elected members of the executive council, and a vote of thanks to the chairman concluded the business.

ADULTERATION OF BREAD.—William Norton, a baker, has been indicted at the Boston Quarter Sessions for adulterating bread with alum to the extent of 50 grains per 4 lb. loaf, and sentenced to imprisonment with hard labour for one month.

THE BUILDING TRADES EXHIBITION.

THE fifth annual exhibition of building trades materials, architectural designs, &c., was opened at the Agricultural Hall on March 24, and closed on the 5th inst. There is no doubt that the attractions of South Kensington in connection with the approaching Health Exhibition have been the means of withdrawing many names from the Islington show that would otherwise have appeared there. There were not many novelties that call for any special remark, but of such as are likely to interest our readers we give descriptions and illustrations. Building materials, as bricks, stone, roof coverings, &c., were well represented; joinery work found several exhibitors, and the show of interior decoration was decidedly strong. Amongst the newest adaptations of materials in use for these purposes, 'slagwool,' or 'silicate cotton,' is now being utilised for the ceilings of rooms or the lining of walls, the material being practically fire-proof. Of a somewhat similar character, is the fibrous plaster now so extensively used for artistic interior decoration. This material entirely supersedes the use of lath and plaster for ceilings, being made in sections, in the most artistic designs, and screwed up to the joists. Grates, mantelpieces, kitchen ranges, &c., formed another important section, Messrs. Yates, Haywood & Co., of Upper Thames Street and Rotherham, having a really magnificent display, in which overmantels in cast iron, variously coloured, formed a conspicuous feature. Not so extensive, but possessing real merit, was the exhibit of Messrs. Underhill & Co., 171 Upper Thames Street, who showed a few charming suites for dining and drawing rooms, and some remarkably cheap tile-lined grates. In sanitary ware a most extensive collection was sent by Mr. George Jennings, of Stangate, Lambeth, which comprised nearly every article coming under that head, including several specialities with which Mr. Jennings' name has become associated.

Messrs. Capper, Sons, & Co., Ingram Court, Fenchurch Street, now well known as the proprietors of 'Pearson's Patent Twin Closets,' exhibited these appliances and a commendable assortment of lavatories, lavatory basins, secret urinals, and lavatories for office use, &c. Although the Twin Closet has been described in these columns, its peculiarities will bear repetition, being unique of its kind. It is composed of closet and water cistern in one piece of earthenware, and if the seat of the framework is hinged, the lifting of it exposes the whole to view, and renders access to the ball-tap an easy matter. The accompanying illustration gives



its shape, and it may be said to be devoid of all mechanism, the lifting of a plunger, rendered air-tight by a thick vulcanised India-rubber washer, giving access to the soil-pipe, the flush of water being all that can be desired. For the secure fixing of the Twin Closet, and to guard against the inroads of rats, the firm have a most perfect joint (Brian Jones's), which can be recommended with confidence as offering the greatest security against vermin and the permeation of sewer-gas into the house. This closet has secured a most extensive sale, its simplicity, easy accessibility, and security having rendered it an especial favourite.

The Automatic Disinfector Company, of Queen Victoria

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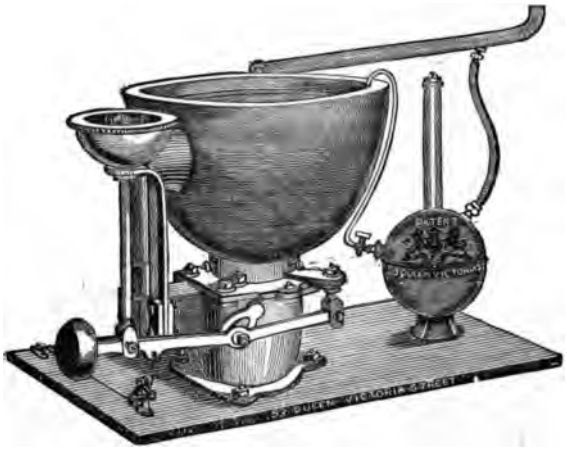
and Cannon Street, exhibited their ingenious appliance for supplying a disinfectant to closets by automatic means whenever it is used. The idea is not an original one, but there are commendable points in this appliance that deserve a detailed description. An illustration is appended showing



a closet with the Automatic Disinfector by its side. It is a globular copper vessel communicating on the right-hand side by a pipe with the water supply, and on the left by a very small one carried over the closet-pan. The copper vessel is filled with a disinfectant which is rendered immediately soluble on the introduction of water to it. On lifting the plug to open the water-valve a portion of the water passes into the disinfectant vessel, dissolving a portion of the crystals and carrying them in the form of fluid into the pan, the bulk of the water and the disinfectant meeting together and rendering the whole flush a powerful deodoriser. This has the effect of rendering the drain, as well as the surroundings of the closet, perfectly sweet, as the disinfector is brought into action each time the closet is used. Small as the vessel holding the disinfecting powder is, it will hold sufficient to deodorise 10,000 gallons of water, or a year's supply. The company have a variety of disinfecting powders, all applicable to the purpose, and each possessing an aromatic odour. We are informed that contracts are being entered into with owners of emigrant ships for supplying the invention to their closets, generally a source of anxiety to the officers, and that the disinfector will supply sufficient deodorising material for six months, even if each closet be used one hundred times a day. The cost of fixing these appliances to domestic closets is so small, as well as the annual expense of the disinfectant, that all who study the health of their family will do well to adopt this apparatus.

Of somewhat similar character is the invention of the Austin Antiseptic Company, 61 Wool Exchange, E.C., who claim to effect a saving of 400 per cent. in water in flushing public urinals, latrines, &c., where their system is adopted, the constant admission of the disinfectant with the water rendering a smaller supply of the latter necessary. The most novel application is, however, to be found in the patent 'Austin' porous disinfector, applicable to either domestic water-waste preventers, cisterns, &c., or public arrangements. This consists of a circular tube of porous clay, which is filled with a soluble deodorising crystal, and secured by a cap. It is laid in the bottom of the cistern, or suspended in it, and the water permeates the pores of the clay, dissolving the crystals, which in their turn escape in their liquid form into the bulk of the water, rendering the whole a disinfectant fluid. By this means every drop of water used for such purposes in a dwelling-house becomes a disinfectant, non-corrosive, inodorous, and non-poisonous, and it must be evident that the effect of this upon the drains of a house must be of a very beneficial character. The low price at which the porous disinfector is supplied places it within reach of all householders, for it can be purchased for *6s. 6d.*, and will hold sufficient disinfectant to last for six months.

The Albion Concrete Co., Haymerle Road, Peckham,

S.E., give their attention principally to architectural dressings, and the collection they have sent is well worth notice. All the work, which by the way has not been specially got up for the Exhibition, but is on order for various buildings, is exceptionally well turned out ; the arris is so sharp and clean, and the section of the mouldings so uniform, that it has the appearace of natural stone. The company have secured the contract for Messrs. Tussaud's new galleries, Marylebone Road (J. W. Hunt, architect), and specimens of the string courses, cornices, &c., are shown.

The Patent Victoria Stone Co., 283A Kingsland Road, are another firm whose exhibit of artificial stone deserves comment. This grey stone is applicable either for architectural work or for paving, but it is probably in the latter form that it has obtained most notoriety. It has been put to severe tests by many of the metropolitan vestries, numerous provincial authorities, and at railway stations, and in similar situations. It is very hard and durable, and can be worked with a chisel in the same way as ordinary stone. The stand was well stocked with various specimens, and showed to advantage such articles as vases, pedestals, window heads and sills, nosed steps, wall copings, railway platform copings, and slabs of the paving.

The Mangotsfield Pennant Stone Company, Staple Hill, Bristol, were present with specimens of this admirable paving stone, to the salient features of which we have drawn attention on previous occasions, it being claimed for it that, while being nearly as hard as granite, it does not wear so slippery.

The Bower-Barff Rustless Iron Company, 23 Queen Victoria Street, E.C., whose useful and effective process for rendering iron rustless has been mentioned in the SANITARY RECORD on previous occasions, were present with a variety of specimens, and, judging from the wide area of production embraced, the process would seem to be increasing in favour.

Messrs. C. Kite & Co., Chalton Street, N.W., are amongst the oldest manufacturers of ventilating appliances. Their goods and the salient features of their various patents are so well known as to require but a passing remark. We append an illustration of a fresh air inlet ventilator which is now being extensively used. It has gained the medal of the Sanitary Institute, and has been thoroughly tested by their jurors. It is so arranged that, whatever be the force or direction of the wind, the air will be dispersed upwards at an angle without causing draught. It should be fixed from 5 to 6 feet from the floor, and, when used in combination with one of Kite's patent noiseless chimney

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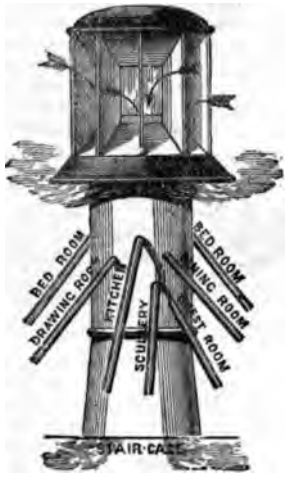
breast ventilators, a most successful system of ventilation results. A good selection of patent exhaust roof ventilators, patent exhaust and inlet ventilators for sewers,

register turret ventilators, ships' ventilators, and chimney cowls completed this exhibit.

Messrs. J. M. Lamb & Co., 119 Finchley Road, are another firm who made an attractive and interesting exhibit of ventilators, chimney cowls, &c. The peculiar merits of their 'Triumph' revolving head pattern, as adapted to public or private buildings, railway carriages, &c., were pointed out and illustrated in our issue of October 15, 1883. Since that date they have introduced a chimney cowl constructed on the principle of the malthouse and lobster back, but is of very superior make, and with the addition of a louvre construction over an exhaust chamber, with guides that cause the wind to constantly pass through the section. Another new feature also shown for the first time is their 'Patent Fixed Outer Section Cowl,' of which we are enabled to append a sketch.

This has a double cone, and is a very valuable cowl, giving a very rapid and free exit for the smoke. The single cone pattern is constructed on the same principle, and is equally effective in its way. Amongst its advantages are—that the wind is not diverted upwards from its natural course, but allowed to proceed naturally; the dividing plates collect the wind over the full width of the cowl, and pass it over the inverted cone outwards, so producing a strong induced current over the orifice of the body or shaft and a powerful up-current in the chimney. No down-blow can enter the shaft from a heavy blast; and, as there is no obstruction in the inside, can be readily swept.

Messrs. E. Aldous & Son, 205 Romford Road, Stratford, and George Street, Camberwell, S.E., exhibited their ventilators for buildings, ships, sewers, &c. The system of this firm is quite unique and is claimed by them as being the only effective one for ventilating a number of apartments in one building by one exhaust. The action was described a short time ago in our columns,



but a glance at the annexed cut will give a fair idea of the principles upon which it is constructed, and shows that it is not dependent upon the state of the atmosphere, the most boisterous weather not facilitating, nor the calmest retarding, its perfect performance.

Messrs. Robert Boyle & Son, Holborn Viaduct, and Glasgow, made the largest display of ventilators in the building, their self-acting air-pump exhaust ventilators being conspicuous. The firm have recently again reduced these appliances in price to enable them to be used upon a cheaper class of buildings, and they may now be considered as the most economical in the market, if quality be taken into consideration. Some of the turret form exhibited are artistic in appearance, and whatever the style of building to be ventilated, Messrs. Boyle are prepared to carry out a design that, while securing the principle of the invention, shall be in harmony with the architecture. Specimens of ridge ventilators, invisible roof ventilators, railway carriage ventilators, and others for soil-pipes and drains were also on view. To meet the special requirements of the day the firm have designed a cheap system of ventilation for workmen's cottages. In such dwellings, presuming there to be four rooms, they are prepared to fit up an entire apparatus for the low charge of 4*l.* 10*s.* which they declare to be the cost price, but as this arrangement is intended exclusively for the benefit of the working classes, they notify that only *bonâ fide* orders will be executed at that price.

The Blackman Air Propeller Company, of Fore Street, E.C., were present with their unique invention in operation. This appliance was described and illustrated in the SANITARY RECORD of Nov. 15, 1883, and from its construction, and the purposes for which it is intended, is probably without a rival. Composed of a fan with blades of peculiar shape, it is intended to move large bodies of air rapidly, and, according to the manner in which it is set, it will either extract vitiated, or introduce fresh air. For factories where processes are carried on that cause large quantities of dust or particles of the materials in use to be disseminated, it offers a quick mode of extraction, and such is the force of current, that from any aperture

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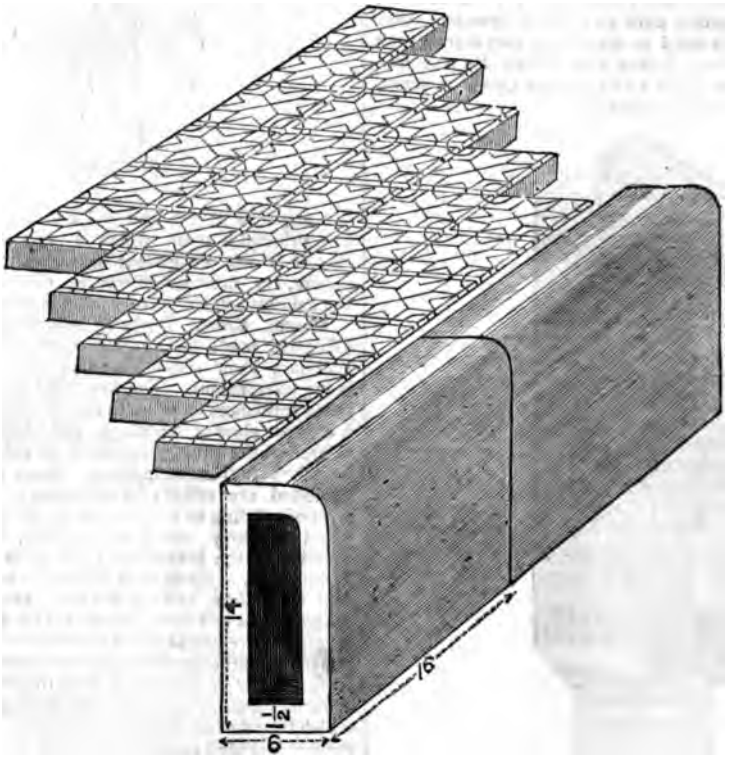
communicating with the outside, a stream of fresh air will be brought in. It is equally applicable to mines, for public buildings, &c., as although requiring a certain amount of motive power to actuate it, this is so small that wherever a motor of any kind is in use, the quantity required for the air propeller is so small as to make no visible difference to its work, and the motion can of course be regulated to the requirements of the building. One size is made small enough for a large private room, and may be worked when only occasionally required by hand, from the outbuildings.

Messrs. Candy & Co., Limited, of Newton Abbot, Torrington, aad Bideford, Devonshire, whose superior productions in semi-vitreous bricks and brick ornament were noticed in the last issue of the SANITARY RECORD, were present with specimens of their various manufactures. One of the uses to which the semi-vitreous bricks have been extensively applied is the paving of stables, &c., their white colour materially assisting the light in such places; the London General Omnibus Company are now generally adopting them. For steps, footpaths, &c., they are equally in demand, their imperishable as well as non-absorbent features rendering them a very economical flooring. One of the patterns in large demand is here illustrated. These semi-vitreous bricks can be



made in any required design suitable for such an article without enhancing the cost, the price at which they can be supplied being about equivalent to that of the Staffordshire blue brick.

The display of non-arsenical wall papers made by Messrs. Woollams & Co., High Street, Manchester Square, was chaste in design, and exhibited a great amount of artistic feeling, while demonstrating the facilities that now exist for producing the most *recherché* as well as the least expensive designs of an innocuous character. The improvement in taste that has of late years been visible in wall and ceiling decorations was clearly shown in this exhibit. A fine example of colour printing presented itself in a handsome Italian brocade pattern, designed by Mr. A. Silver, and printed in six different coloured blocks on a gilt diapered ground. Another of a smaller scale, composed of flowers, leaves, &c., treated conventionally in shades of blue and green on a terra-cotta ground, arranged as a dado decoration, from the pencil of Mr. Bernard Dicksee, was an equally meritorious example. An inexpensive decoration for corridors, staircases, &c., very effective in appearance, was contributed from Mr. A. F. Brophy, and was worked as a single print in shades of terra-cotta. Another dado decoration merits especial remark, Miss Louisa Aumonier being the designer. It was Italian in character, having a panelled dado, and a fine block damask filling, taking a 36-inch repeat. A charming companion to this consisted of a ceiling decoration in a rich raised block ceiling paper, designed by Mr. H. Noble. Some chintz patterns, re-coloured to suit modern requirements, on mica grounds, were conspicuous features. This material, in a powdered form, is entering largely into the composition of better-class papers. In the hands of a clever manipulator, it is made to resemble silk in appearance rather than the old satin papers, and being perfectly innocuous and almost imperishable is likely to retain its position. Miss Aumonier contributed another rich example in a damask pattern in Van Eyck red, and there were many others equally commendable. The same artistic feeling was evinced in many of the lower priced decorations, whilst everything exhibited was of a purely sanitary or innocuous character.

The increased favour in which mosaic flooring is now held was evinced in the interest taken in the exhibit of Messrs. Diespeker & Co., of the Holborn Viaduct. The head establishment of this firm is at Venice, but they have branches at Vienna and other continental cities: consequently they are in a position to reintroduce, if necessary, any of the old examples by which they are surrounded. At the same time, they have sought in many of their specimens to adapt the designs to the style now in vogue in England. Since their London branch has been opened they have been patronised by many architects of note, and the demand for their work is constantly increasing. One of the patterns shown is a

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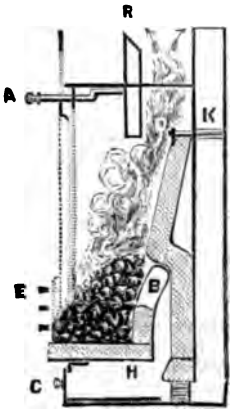
replica of that laid down at Glasgow University, and another at Hints Church, near Lichfield, under the direction of John Oldrid Scott, Esq., F.R.I.B.A. This is a plain Roman border, with Pompeian corners and Roman mosaic centre. Another, as laid at the Hyde Park Mansions for Messrs. Wheeler & Warren, represented a vine leaf, with border of the Elizabethan period and Venetian (Mischiato) centre. The treatment of flowers in many of the designs was remarkably good, and the blending of colours in others quite harmonious. While evidently desirous to cultivate a taste for the better sorts, and employing artists of great ability, Messrs. Diespeker show that they can supply the flooring at a very low cost, and they exhibited one specimen which they are prepared to lay down as low as 8s. per yard, a price that will compete with the cheapest tile, at the same time being much more durable. The mosaic is embedded in a specially prepared mastic of their own invention, which, they claim, will render the material practically imperishable. In addition to the flooring, some fine examples of ecclesiastical mosaic in glass were exhibited, the facilities the firm enjoy in being enabled to study the works of the old masters enabling them to reproduce these with truthful accuracy.

Mr. R. Adams, 7 Great Dover Street, S. E., was present with the many useful domestic inventions in connection with windows, doors, &c., that he has virtually made his own. Most of these have often been mentioned in these columns, and there is scarcely an article he has introduced (if any) but has become a decided success. His patent fanlight opener has secured a most extensive sale, but owing to that constant desire for cheapening every article that is seen to be of value, a demand for a lower priced one has set in, and to meet this requirement Mr. Adams has introduced a new 'motion' that reduces the cost considerably. We give an illustration of this 'movement,' which may be thus described :—A jointed folding rack of brass, as seen in the engraving, is fixed above the fanlight, into which a

wormed circle is made to revolve by means of an endless cord passed through an ordinary rack-pulley, as used for a common blind. The fanlight can be fixed to open inwards or outwards, and from the bottom or top, according as it is hung, and it presents one of the cheapest (while effective) means of opening or closing those useful appliances. Mr. Adams has also introduced a simple means of altering existing windows to the principle of his anti-accident window, enabling them to be 'swung' by means of a pivot in the centre for cleaning from the inside. While effecting this desirable change, the invention has the advantage of excluding draughts, and preventing the windows from shaking. The rest of the exhibit comprised the many little inventions he has from time to time introduced, assisting to provide security and comfort in connection with doors and windows.

Of grates claiming to be of smoke-consuming principles, Jaffrey's Patent Grate Company, 6 Charing Cross, were the only exponents of an appliance in action. The opening of this establishment was noted in our last issue, and further acquaintance with the grate continues to demonstrate its merit. The two illustrations depict it in section and elevation. Adapted to burn either anthracite or bituminous coal, it is introduced as a smokeless, slow combustion, or bright glow grate, and one of its best attributes is the easy and rapid manner in which the two last named changes can be effected, which is done by the movement of two simple valves. The back, sides, and bottom (which is solid) are composed of fire-clay, the lower part of the back being formed of loose quadrant-shaped pieces with interstices between them, communicating with a combustion chamber at the back, and another commendable point is that the whole interior of fire-brick can be taken out, if necessary, leaving nothing but the iron framework. At first lighting, the ordinary valve or register, which is balanced in the centre, is opened, and direct communication with the



chimney secured. It is, however, not necessary to retain it in that position long, for immediately the fire is fairly alight the register may be closed, and a slow combustion or quick draught be obtained, according to the manner in which the other valve is moved. If both valves are closed, the gases from the fuel are in the main drawn through the openings in the fire-bricks before named into the combustion chamber, and any smoke that may be carried upwards must pass down a flue at each side of the grate into the same combustion chamber, where, in connection with the intense heat with which it comes in contact, it is principally consumed before it can pass into the chimney. The valve at the back marked K in the sectional drawing, regulates the quick or slow draught, and this illustration also shows the combustion chamber, and the direction the gases have to travel through. This grate appears to be well adapted to cure smoky chimneys, superheated air rising quickly and producing a good up current in the chimney, thereby rectifying a sluggish draught, and even with the register open there is little fear of any downward current taking effect. The grate is complete in itself without the front, and can be adapted to suit any existing form of flat front now in use. It can also be arranged to bring in fresh air from the outer atmosphere and deliver it into the apartment at any necessary temperature. If economy of fuel is desired, it can be effected ; if a brilliant fire is required, it is also obtainable ; and, taken as a whole, this may be said to be practically a smokeless grate.

Messrs. Hayward & Eckstein, Union Street, Borough, exhibited the several examples of their patent semi-prismatic pavement, lights, ventilators, &c. The former have often been particularised in these columns, and besides are so well known and largely used that further description is unnecessary. The same may also be said of their Sheringham inlet ventilator, as annexed cut, and of their Boyle's mica flap outlet ventilator, which form such

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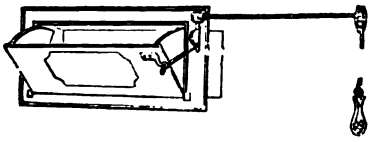
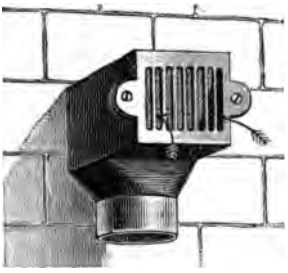
simple and effectual means of ventilating reception



rooms, &c. The following drawing represents a mica inlet valve for drawing fresh air into drain or sewer. It is



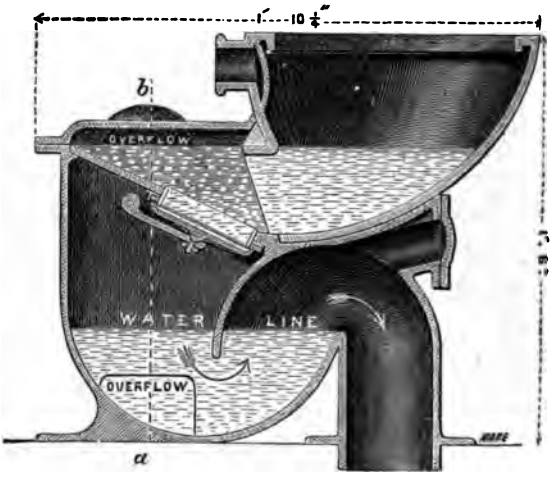
self-acting, and closing against back draught prevents the emission of foul air.

Messrs. J. H. Bacon & Co., 34 Upper Gloucester Place, Dorset Square, N.W., showed their improved hot water apparatus in action, details and illustration of which were given in the SANITARY RECORD of October 15 last. One of the salient features of the apparatus is the special size and make of wrought iron tube used, which the firm were the first to introduce. The exhibit was augmented by a variety of cast iron ornamental coil cases and floor and skirting gratings, many being of registered design and manufactured solely by Messrs. Bacon & Co.

Mr. Milton Syer, 36 Rye Lane, Peckham, S.E., exhibited a new patent water-waste preventing valve, which, unlike any of the various ones hitherto introduced, is actuated by pneumatic pressure. It appears to be simple and very unlikely to get out of repair, while nothing could be desired to work more effectively. In the absence of any illustrations, it may be pointed out that instead of the lever or chain-pull, commonly used with water-waste preventing cisterns, the flush of water is here obtained by pressing a 'Push' piston that has to be inserted in the wall, similar in every respect to those used for pneumatic bells. Thus dispensing with cranks, wires, &c., it is quite noiseless, and as it is also claimed to be frost-proof, this valve should prove a very useful addition to the long list of kindred appliances now in the market.

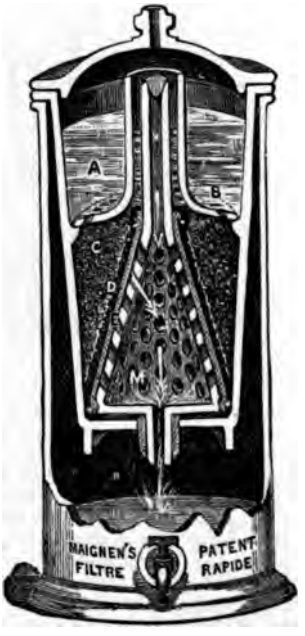
Messrs. Groom & Co., Liquorpond Street, E.C., were present with their several registered and patented improvements in domestic articles of tin-plate ware, including the well and dry platform sponge bath, stove cleaner, milk saucepan, hot water plate, and last, but not least, that admirable cooking utensil, the patent potato steamer. An illustrated description of this useful invention has already been given, but its merits are such that a reiteration of them will not be superfluous. The saucepan contains a loose perforated lining or strainer rather more than half its depth, into which the potatoes are placed with sufficient water to cover them, and after they have boiled for some time, this strainer is lifted up and rested on a hook inserted for the purpose, and so converting it instantly into a steamer. Thus the potatoes are cooked partially by boiling and partially by steaming. The result is that, whatever be the species or nature of the potato, Messrs. Groom's patent yet inexpensive steamer insures its being served up to perfection.

Messrs. R. F. Dale & Co., 1 Bear Lane, Southwark Street, S.E., again occupied the prominent position they secured last year at Bay 1. The exhibit comprised a good general assortment of their various manufactures, which had their usual appearance of solidity and good finish. Not the least important of these is the 'European' side-outlet valve-closet that has been adverted to on other occasions in the SANITARY RECORD, and of which a sketch is appended. It has the advantage of possessing



in combination the salient features of the ordinary 'flush-out' and the 'valve' closets, and though of but recent introduction, is in large demand. It is worthy the notice of all who may not be acquainted with it. A patent ball-valve is also specially worth attention, from the ease with which it can be repaired without skilled labour, should it in course of time wear leaky. Several different kinds of baths, lavatories, pumps, and the numerous accessories for plumbers' work are well represented, the whole making a very useful and interesting display.

Mr. Maignen, of 22 and 23 Great Tower Street, who rarely loses the opportunities afforded by an exhibition, had a stand devoted to the display of his now celebrated 'Filtre Rapide.' A sectional drawing of it is appended,



showing that it takes entirely apart for cleansing. The patented filtering *media*, *carbo calcis*, softens as well as purifies the water. Aeration is also provided for. So simple is the means employed, and so capable of economising space in the filtration of large bodies of water, that certain water companies have the process under consideration

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with a view to its adoption, instead of continuing their present system of filtration.

Messrs. Hodkinson & Clarke, Canada Works, Small Heath, Birmingham, made a much more extensive display than usual. Besides their pretty little structure containing specimens of their many designs in stained-glass window-blinds, Queen Anne blind, Early English shutters, and their elegant drawing-room blinds of Madras muslin, a separate erection was devoted to a display of modern school furniture of an attractive character, some of which was exhibited for the first time. The advantages of their school-room partition have already been alluded to; but in the seat and desk for home tuition Messrs. Hodkinson & Clarke have scored a success, for which every mother will thank them, and which will be a distinct advantage to every child educated at home to whom the privilege of using one is allowed. The child is placed on a seat adjusted to the requirements of the body, so constructed that curvature of the spine, compression of chest, and high shoulders cannot occur, and sits in front of what may without exaggeration be called a neat little 'Davenport' with ornamental iron back, inkstand that can be covered up out of sight, and other little educational arrangements. But apart from its valuable hygienic

qualities, and its attraction to the child, this seat has a very important economical feature, for it is made to suit a child between the ages of six and sixteen; thus, when once purchased, the parents know that they have secured a healthful appliance for their child's studies that will adapt itself to its growth, so long as education is continued at home, without any further cost. The change is effected in a few moments. The seat can be raised or lowered, and the desk or seat moved to or fro to enable the occupant to stand for reading. To further facilitate this object the seat, which is pivoted, moves backwards, a portion of the desk turns up and fixes itself securely as a reading-board. This arrangement may justly be termed the *ne plus ultra* of domestic scholastic appliances.

The Sanitary Paint Company (Griffiths, Berdoe & Co.), of 34 Leadenhall Street, and Liverpool, had their usual attractive display of non-poisonous paints and colours. The advantages of Griffiths' patent white, the groundwork of all, have been so often mentioned in the SANITARY RECORD, and eulogised, that little more can be said of it further than that the demand for non-poisonous colours is greatly on the increase. Their silicate washable distemper also presents meritorious features, offering a cheap and artistic decoration for the commonest walls, in place of papers, and the petrifying liquid for damp walls is possessed of extraordinary resisting power. In our last issue the fact was noted that the firm had been awarded a gold medal at the Calcutta Exhibition for their productions.

The Indestructible Paint Company, Limited, 27 Cannon Street, were also present with specimens of their speciality, 'Browning's preservative paint,' which has been well named. This preparation has been before the public for some years, and ample time has elapsed to test its qualities. Amongst many notable works to which it has been applied, it was selected by the Government on account of its well-known lasting qualities for painting Cleopatra's Needle on the Thames Embankment. It is applicable to all purposes, is supplied in every shade of colour, and can be finished as an enamel surface or 'flat.' Its great advantage is its extreme hardness and its capabilities of resisting all weathers; hence the name given it by the patentee.

The rain water separator of Mr. C. G. Roberts, Haslemere, Surrey, of which a fully detailed and illustrated description was published in the SANITARY RECORD of October 15, 1883, was also exhibited. The patentee is now making them in some other shapes, which, if required, can be finished in an ornamental manner.

In gas apparatus The General Gas Heating and Lighting Company, Limited (late Leoni & Co.), as usual showed to advantage, the superior quality of their appliances in make and finish being apparent. The many productions

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of this firm have from time to time received full attention in the SANITARY RECORD, and the works carried out have been described in these columns. As a detailed description of the Company's intended exhibits at the approaching International Health Exhibition will be published in our Exhibition Supplement, further remarks upon their appliances will be postponed until then.

One of the best assortments of sanitary appliances in the exhibition was that of Messrs. Bolding & Sons, Sanitary Engineers, of South Molton Street, W. One of the oldest London firms in this line of business, their goods are of the very best description, and besides those of their own make exhibited, they are agents for certain other inventors who have patented good and reliable appliances. The exhibits consisted of a variety of closets, comprising Messrs. Bolding's Simplex, Grosvenor, and Argosy valve-closets, Banner's patent earthenware closet, which takes to pieces for cleansing, and the National, Crown, and other wash-out closets. Baths with fittings on the most approved principles were also shown, slop-sinks in various patterns, lavatories, urinals, automatic syphon water-waste preventers, and a choice collection of cocks and other plumbers' fittings, including some remarkable specimens of lead piping bent into traps. A new invention of some merit, illustrated below, is Truss's patent water-waste preventing valves, intended to take the place of the unsightly water supply cistern. The drawing exhibits

it as it stands, ready to be attached to the closet, under the seat. Its advantages appear to be of a multiform character. It can be attached to any closet, dispenses with all other valves, bellows, and oil regulators, is never affected by frost, and does away with the high charges in connection with the fixing of the ordinary water-waste preventing cisterns. It may be described as a double-ended valve with a single outlet, the lower end producing a vacuum when the handle is raised and the valve opened. The pressure of water, however, finally overcomes that on the outlet and closes the valve. It is so arranged that the prescribed quantity, two gallons, shall be discharged at each flush, whether the handle is held up for any length of time, or let go immediately, and the after-flush for the pan is also secured. These valves work equally well under high or low pressure, and have been approved by all the water companies to whose notice they have been introduced. Undoubtedly they offer all the advantages claimed by the patentees, and will prove a valuable acquisition to sanitary engineers.

Messrs. Bradford & Co., of 140 High Holborn, and Manchester, sent a good collection of laundry machinery and appliances, as well as a useful assortment of domestic washing and mangling machines, patent cinder-sifters, and other articles for saving labour. The exhibit included a Vowel A10 washing and wringing machine for steam power, capable of washing 130 to 150 shirts; a patent Vowel Y combined washing and wringing machine, that will wash eight shirts or a blanket; a patent Vowel I combined washing and wringing machine, specially designed for cottage laundrymen or large families; also a variety of other size machines for large or small families, wringing and mangling machines only, and their celebrated Acorn A India-rubber wringer. To enlarge upon the quality, superiority of finish, and ingenuity displayed in every detail of construction of Messrs. Bradford's goods would be quite needless, for they have long been known far and wide as the leading firm in this useful trade.

Two new inventions in connection with gas heating and cooking stoves were exhibited by Messrs. A. J. West & Co., 47 Lisle Street, Leicester Square, who are the sole makers of the Hon. J. W. Plunkett's 'automatic absolute safety gas tap in connection with gas-cooking stoves.' This invention introduced by the patentee for preventing danger in the use of gas-lights in gaseliers, &c., if not properly turned off, has been utilised by Messrs. West for gas-cooking stoves, and will prove a decided acquisition. By the arrangement of a lever in connection with a rod shown on the outside of the accompanying illustration, the opening of the door turns on the gas, which is then lighted, and the flames are made to play upon a metal rod fixed a short distance above them. This expands in a very short time sufficiently to cause a short lever at its end to force up the outside rod, and prevents the larger one before mentioned from extinguishing the gas when the door is again closed. Whenever the gas is required to be turned off this can be done by a supplementary tap from the outside, when contraction of the rod inside takes place, and the lever falls, rendering assurance doubly sure; and when the door is closed, even if the supplementary tap is turned on, the gas in the oven cannot escape until the door is opened, bringing the Plunkett tap into use. The great advantage of this application is that explosions cannot occur, or gas escape to taint the food or be wasted, a desideratum that should go far to overcome the objections of those who still fear danger from using gas, as well as a safeguard against careless servants. The other invention shown by Messrs. West & Co. is an improved portable heating-stove, also illustrated, which it is claimed,

consumes the whole of the products, and renders any outlet unnecessary. Some very crucial trials have taken place to test this theory, and so far with satisfactory results.

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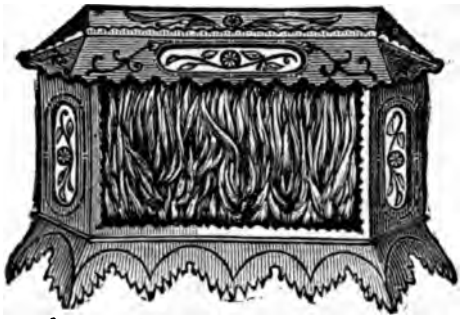
t will be observed that the stove does not differ in appearnce from many others known, nor can the difference be een by a mere glance at it. The face is a slab of re-clay covered with asbestos shavings, fixed in an iron ame, the gas burners being at the bottom in front. When ghted, the flames, from the construction of the burners, rrange themselves into a solid mass, and rise over he top of the front slab, and down behind it, he back being formed into a heating chamber by

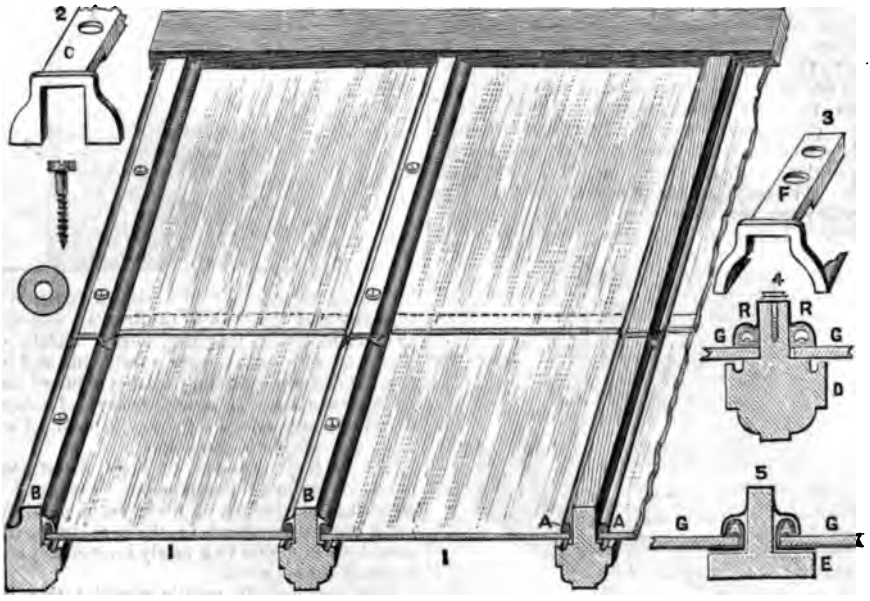


neans of a second slab of fire-clay placed at its back a hort distance from the front one. As there is no other neans of escape for the products they must pass to this hamber, and the residue again comes to the front from n opening at the bottom and mixes with the burning gas. The improvement here is in the heating-chamber, which aturally becomes highly heated in a short time, and must ecessarily destroy a large portion of the effluent gases.

Messrs. Drummond & Lindsay, 55 Lothian Road, Edinburgh, sent specimens of their Patent Glazing as ately introduced by them and shown at the Sanitary Congress at Glasgow last September for the first time. They work two distinct patents, and an illustration

allowing sufficiently for expansion or contraction. These slips are of course fitted before conveying to the roof, so that glazing may be conveniently carried on in any weather. B is a zinc cap that keeps the panes in their place on the bar, which may be of wood or iron. The arrangement is so complete that no water can possibly penetrate from the surface to the edges of the glass, so the system is specially adapted for roofing buildings in exposed or elevated positions, and has, we understand, given much satisfaction wherever fitted, and proved capable of withstanding the heaviest storms of wind and rain. Mr. Drummond has also patented a system of ventilation in connection with the above which possesses some novel features, and is well worth consideration, as it dispenses with the oftentimes cumbrous wood opening frames, and gives a much neater appearance to the roof as well as minimising breakage.

To householders one of the most useful new inventions shown at this exhibition was an improvement in the arrangement for securing the knobs on lock-spindles, a matter that has occupied the thoughts and puzzled the brains of many ingenious persons for a long time past. Who is there who has not felt the annoyance of the knob of a door-lock becoming loose and falling off, and who, after sending for the locksmith, has soon again experienced the same annoyance. Many inventions for obviating this difficulty have been introduced, but they have been anything but perfect, and the question had scarcely advanced a stage towards improvement. Mr. T. H. P. Dennis, of Chelmsford, the principal of a firm who have brought out several useful inventions, has apparently secured the desideratum, and by the most simple means. Discarding all side screws and other means hitherto adopted, Mr. Dennis taps the end of his spindle some distance down, and countersinks a small hole in the centre of his knob. Into this a screw of small diameter and fine thread is inserted and screwed into the spindle until its



is appended of one which possesses the most important features. It differs from all other existing patent systems of glazing in that it does not discard the use of putty, yet any pane of glass can easily be removed without disturbing the adjacent ones. The following description referring to the drawing will show the principle of it. A A are side slips fitting tightly on the edges of the glass, and filled with prepared putty that will not dry or harden; they form ridges that materially strengthen it, while head rests in the countersunk cavity, and presents a perfectly flat surface. It must be obvious that with such an arrangement it is absolutely impossible for a knob to come off, and its even becoming loose is almost as certain. For glass, china, or wood knobs, an ornamental-topped screw is used, and the same security obtained. This invention adds but a few pence to the cost of the most expensive lock furniture, and less to the common sorts. The great interest taken in Mr. Dennis's stand by the bulk of the

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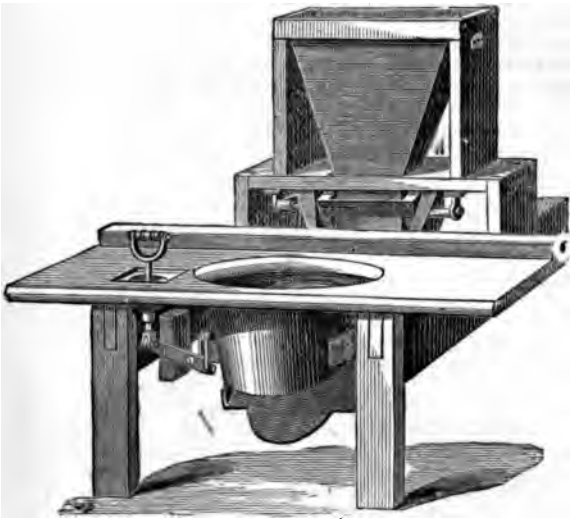
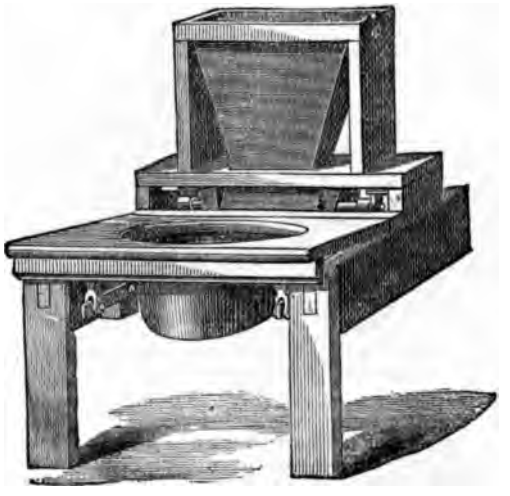
visitors showed clearly that the advantages of the new arrangement were highly appreciated.

Earth-closets were shown in a variety of forms by the pioneers of this industry, Moule's Patent Earth Closet Co., Garrick Street, Covent Garden. Like many other inventions, the earth-closet of to-day has been very much improved upon since its introduction nearly twenty years ago, and, under the supervision of their indefatigable manager, Mr. John Ward Girdlestone, the company have brought it to what we may safely call perfection. The following engraving depicts their No. IX. 'Pull-up'

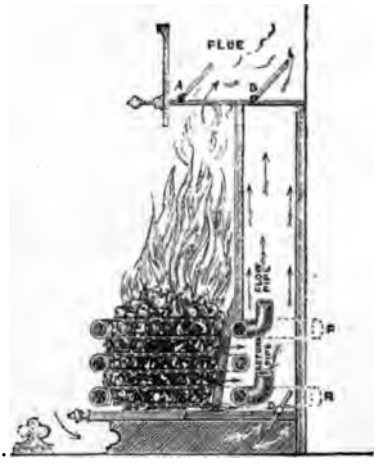


apparatus. The most salient feature, and also a most desirable one here to be noted, is the arrangement whereby the contents of the receptacle are effectually concealed, as the user of the closet previous to its use sees nothing beneath the seat but an earthenware rim and a layer of clean dry earth, which rests on a valve beneath the rim. On the handle in the seat being raised after the use of the closet, the soil on the valve is upset into the receptacle; while, on the handle being returned to its normal position, a fresh charge of earth is spread over the valve in readiness for the next user of the closet, the valve at the same time preventing almost entirely all upward draught. We give an illustration of



another apparatus that has very unique advantages, but of not quite so recent a date as the one just referred to. Besides other examples of closets and commodes, models were exhibited illustrating the applicability for the use of these closets on the first floor of a house by the following arrangement. Immediately under the seat is a receptacle held in suspension by two weights, chains, and pulleys, which, working in a channel prepared for it, can be lowered to be emptied, and then drawn up again to its proper position. This channel or 'lift' should be made against the outer wall of the house, and accessible to the garden, so that the attendants need not enter the house. The 'Broadmoor Tank,' a strong iron receiver running on wheels; and a War Office pail, as supplied to the Government, are useful accessories and well worth attention.

Mr. S. Deards, Harlow, Essex, exhibited his patent system known as the 'Victoria Dry Glazing,' which is suitable for greenhouses, conservatories, or the roofs of railway stations and other buildings. The special features of the patent lay in the construction of the sash-bar. This is composed of two zinc or copper tubes combined, resembling a letter X, in which the glass is placed, and upon which a cap slides, and is held securely down by one screw. It thoroughly keeps out wet, and the glass does not rattle, while there is sufficient allowance made for expansion and contraction. Mr. Deards, it will be remembered, is also the patentee of the 'Princess Louise Coil Grate,' a very excellent and economical apparatus. A sectional sketch of it is appended, and a glance at same will show that the bars are



composed of wrought iron hot water tubes which are carried round the back of the fire also, and conveyed away to other rooms, so that they form a system of hot water pipes and will warm several apartments and passages at a cost for fuel not exceeding what is required for an ordinary sitting-room fire. It is under easy and complete control, as valves are provided by the adjustment of which slow or rapid combustion is obtained.

Mr. T. J. Constantine, 61 Fleet Street, sent his usual good collection of the popular 'Treasure' range. The important advantages of these useful cooking ranges have often been pointed out in these columns, but we would now draw attention to a newly improved patent, of which a sketch is appended.

Our readers will readily perceive that it is still the 'Treasure,' but with an open instead of a close fire, an improvement that all who are prejudiced in favour of a bright open fire will much appreciate. It also meets the requirements of those good, old-fashioned Englishmen who still think the only proper way to roast a joint is to cook it in front of the fire. Upon looking at the illustration, a ring will be seen projecting below the bars: this is attached to the bottom grate, which is in a piece by itself and has sufficient play to allow of its being moved backwards and

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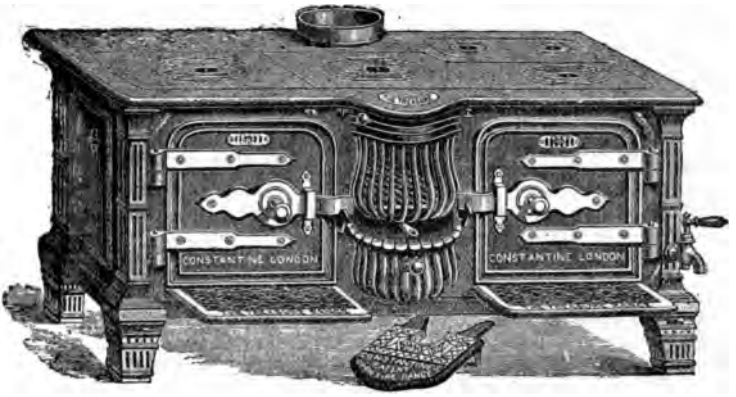
forwards for the purpose of clearing the fire of dust and cinders. This almost entirely dispenses with the necessity for poking the fire, and so saves a considerable amount of fuel, as the constant stirring or poking a fire generally means wasting a quantity of unburnt embers and half-consumed coals.



It will be remembered that Mr. Constantine has been in the habit of supplying cooking utensils for and specially adapted to his ranges, and, to make the new open fire more thoroughly complete, he has devised a cheap and ingenious meat-screen for putting before it.

Mr. Constantine is fitting his apparatus in one of the model kitchens in course of erection at the International Health Exhibition, so that an opportunity will be afforded for its inspection by the public.

SANITARY DOINGS OF THE MONTH.

By Our Roving Commissioner.

The Exhibition season has now fairly set in, that of the Building Trades at the Agricultural Hall having closed on the 5th inst. This is to be followed by one at Birmingham under the same management as the London one, and in connection with it we are promised a large display of gas appliances for lighting, heating, and cooking, commencing April 28. Another, for furniture and general decoration (being the third annual display), will be opened in the Agricultural Hall in May, and the International Health Exhibition will also open at South Kensington about the same time, all of which goes to show that Exhibitions are far from being played out yet, as some persons imagine. At these gatherings we are accustomed to have brought prominently before us the newest inventions in those branches of trade intended to be illustrated by the Exhibition, and at the one recently closed there were features of a commendable character—inventions tending to further comfort and security to health.

Light to basements.—Considering the thousands of people who have to pass most of their working hours in the basements of our trading establishments, every care should be taken by employers that as much daylight as possible should be admitted into such places. Although a great improvement is visible of late years, and most new buildings are supplied with means for the admission of daylight, in numerous instances, notably in old houses, gas is still used to a large extent. This system of providing light is objectionable, being highly injurious to the health of the inmates, and we are surprised that employers do not look after their own interests by endeavouring to rid themselves of the rather large annual outlay that they must pay for gas. There is scarcely a basement in which artificial daylight could not be introduced if the proprietors willed it, and after the first cost of laying down, no expense would afterwards accrue. The semi-prism pavement lights, such as are manufactured by Messrs. Hayward & Eckstein, Union Street, Borough, effect this object in a most admirable manner, and they can be arranged in such a manner that the light can be thrown forward to any obscure or dark corner of the room, rendering gas until nightfall at least quite unnecessary. There are several modes in which the invention can be applied, and so highly are they estimated by some architects and builders that in the new buildings now in course of erection in Chancery Lane the firm have received an order that will require from 1,500 to 2,000 feet of these artificial daylight promoters.

The Preservation of Meat.—There is no question of greater moment in a domestic sense than the food supply of this country, and we have recently seen how jealously any attempt is looked upon that places the slightest restriction upon the importation of meat, even when brought forward with laudable intentions, and as a safeguard to health. The best and most economical means of preserving meat is unquestionably of the utmost import. A few days since a party of gentlemen assembled at luncheon at the Adelphi Hotel, the object being to test the quality of meat preserved under a process introduced by Mr. R. Jones, L.S.A., of Berkeley, Gloucestershire. The meat in question was the carcase of a sheep killed on Feb. 8 and delivered over to the custody of the Society of Arts on the 13th of the same month, where it had remained hung in an open cellar until the day before the luncheon. The joints consisted of roast haunch, boiled leg, cold shoulder, and Irish stew, while the chops uncooked adorned a side table, and were offered to any of the party who chose to take one away with him. The writer, who formed one of the party, was asked to carve the boiled leg of mutton, but, unfortunately, this had been too much cooked, and to a slight extent interfered with the objects of the patentee. I have, however, no hesitation in saying that had this joint been taken from the boiler a quarter of an hour to twenty minutes earlier it would have proved exceptionally juicy and toothsome food. As it was, it appeared to some to be slightly tough, but as fresh as if only killed a few days prior to the feast. The roast haunch was perfection. Occasionally, perhaps, a little bit of the outside may have had the taste of having been well hung, but nothing whatever objectionable was apparent to the taste. The cold shoulder proved the most perfect eating that could be desired, and elicited the approval of all who tasted it, and the Irish stew was a most savoury dish. So far I have alluded to the tenderness of the joints; and I may as well at once add that to the party generally who were called together, knowing what they were about to partake of, with their prejudices no doubt upon the alert to detect any foreign flavour, not one—with the exception of a gentleman who is constantly connected with the material employed in the preservation—could say that there was anything but the flavour of fresh meat apparent. Now for the mode of preservation. Space precludes my entering into all the details connected with this important invention; but I may say that Mr. Jones has for many years devoted his time and thought to the question, and that boracic acid or a mixture of that and salicylic acid are the antiseptics used for the

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purpose. The animal selected is first stunned and rendered completely insensible; the jugular vein is then compressed at a convenient spot; by means of a trocar with a cannula or an aspirator needle, the blood of the animal is allowed to flow to any desired extent, and the preserving substance in a fluid form, at about blood heat, is allowed to flow freely through a flexible tube until all air is expelled, and, thrust into the cannula, flows through the animal, permeating the whole body. After the lapse of a few minutes, according to the size of the animal, a bubble of air is forced through the tube into the vein or blood-vessel, and, passing to the heart, life immediately ceases. Mr. Jones has lately received the assistance of a gentleman, resident in London, Mr. W. L. Strong, No. 5 Bishopsgate Street Within, who has taken interest in the process. I am informed that many more crucial tests as to the length of time and most adverse circumstances under which meat may be supposed to decompose have been carried out with joints preserved by Mr. Jones's patent. One most important matter connected with this invention is the small cost of preservation. I am told that an ox can be preserved at a cost of from two to three shillings, and a sheep for threepence! The time occupied would be for the larger animal about ten minutes, and for the smaller about four minutes, no skilled workmen beyond ordinary butchers being required.

SANITARY INSPECTORS' REPORTS.

BRADFORD (YORKS).—The report prepared by Mr. Chambers, the chief inspector of nuisances, on the sanitary work carried out in this borough during 1882, is an excellent example of method and arrangement. It takes cognisance not only of ordinary routine duties, but of the inspection of lodging-houses, canal boats, burial-grounds, cowsheds, and new buildings. In this last respect the requirements of the Corporation are now so well known that, with the exception of dampness, and in some cases the employment of inferior material, little fault is to be found. The practical work of the year included, amongst other items, the disconnecting of 1,705 sink-drains, the provision of proper doors and covers to 1,370 privies and ashpits, the repairing of 86 defective water-closets, and the draining of stagnant water from 334 ash-pits. In 873 instances water-conductors were provided and the downspouts connected with the drains, 501 filthy privies were cleansed and limewashed, and 22 new water-closets were erected. A large number of houses were repaired and ventilated, and 100 were provided with proper drainage. In some of the slaughter-houses a change for the better was noted, but the erection of a public abattoir, which is being considered, should secure a greater improvement by bringing about their entire abolition.

BURY.—We have before had occasion to speak in favourable terms of the reports from Mr. Wilkinson's pen, and we note with satisfaction that his last report is quite up to the average. The inspector speaks in high terms of the Hyde system of closets, of which there are now eighty-one in use, observing that not a single tenant or property owner who has once tried them would wish to change. As in previous years, the destructor proved of immense value in ridding the town of offensive accumulations, nearly 4,352 tons of rubbish having been consumed during the year. On his appointment as inspector of common lodging-houses, Mr. Wilkinson made several inspections of every registered house, and, generally speaking, found them in a satisfactory condition. Several lodging-houses of a kind to which the term 'common' did not apply have now been brought under the operation of section 90 of the Public Health Act. Some useful sanitary work was performed in such a manner, the inspector observes, as not to require further attention for some years to come, unless by reason of wilful or careless misuse.

DERBY.—In addition to recording the number of nuisances reported and abated, Mr. Clarke shows that sanitary work has been carried on in a variety of directions. He speaks in high terms of the utility of the destructor and carboniser in destroying decaying vegetable refuse, offal, &c. Everything passing through the furnaces comes out thoroughly purified, reduced in bulk and useful in one way or another, while the charcoal produced by the carboniser has been used as a deodorant instead of carbolic powder. A large number of wells were permanently closed, the town water being laid on to 364 houses and to 57 water-closets. As many as 750 sink-drains were disconnected, in addition to the trapping and repairing of many others, and 33 privies were converted into water-closets. In connection with the prevalence of infectious disease, 3,926 visits were made, and 733 rooms fumigated, the clothing and bedding being removed when necessary to the disinfecting oven. Altogether 2,171 notices were issued during 1882, no fewer than 914 of which were to secure the cleansing of foul privies, drains, cisterns, and passages, 337 to disconnect sink-drains, and 121 to lay on town water. In a large percentage of cases these were complied with, but the exact figures are not given, as one notice often refers to several houses.

GOVAN.—Mr. Mackay's first annual report on the work of the sanitary department of this burgh is a very satisfactory production. It takes cognisance of a variety of subjects, such as the prevalence of zymotic disease, the defects of house drainage, overcrowding, &c., all of which are discussed in a practical manner. Mr. Mackay's experience has convinced him that nothing short of compulsory notification is necessary if the spread of infectious disease is ever to be controlled. During 1883, when measles and scarlatina were chiefly prevalent, it often happened that the first intimation the department ever received of their existence was through the death register, and upon inquiry it was found in the majority of cases that but scant attention had been paid to isolation or disinfection, or, indeed, to the adoption of any means which would in the slightest degree prevent the spread of infection. The appendix to the report contains in a tabular form a summary of the various works performed during the year. As many as 577 cases of infectious disease were visited, and 524 apartments fumigated and whitewashed. Mr. Mackay describes at some length a 'smoke test' which he has found of much value in testing the soundness of house drains. A machine consisting of small but powerful fanners, worked by hand, sets up a strong blast of air, which plays upon ignited cotton waste, saturated with certain chemicals, placed in a closed chamber, the bottom of which is fixed to that part of the drain immediately next to the property side of the trap. In a short time smoke issues through all openings in drain, soil-pipe, rainwater and sink waste-pipe conductors; and in dark recesses where the smoke cannot be seen its peculiar odour can be easily detected. With the exception, perhaps, of some immaterial details, the invention is no novel one in England, where it has often been used with success (see SANITARY RECORD, Vol. xiv., p. 308, and page 487 of present number). One of the most common defects found by Mr. Mackay by the use of the instrument is an 'open joint' at the connection where the shoe of the soil-pipe should enter the faucet end of the fire-clay drain-pipe. In some cases the vertical pipe simply looks at the mouth of the horizontal, while in other cases it has got its mouth turned at right angles.

JARROW.—Mr. Batey's report consists of a statistical return of notices issued by him during 1882 for the removal of nuisances, &c. As many as 497 were to secure the whitewashing and purifying of rooms and passages, 463 to remedy defective drainage, ashpits, and privies, 325 to remove offensive accumulations of refuse, 25 to provide more closet or privy accommodation, and 15 to fix subsoil drains. Thirty-five cases of overcrowding were abated, and in 21 instances the owners were required to provide

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additional ventilation. Attention seems to have been directed to the condition of the common lodging-houses, and to the premises where infectious trades are carried on. During the year 528 cases of infectious disease were notified in accordance with the provisions of the Jarrow Improvement Act, and as many notices were issued for the disinfection of houses. Mr. Batey does not show how far the requirements of the sanitary department were complied with, an omission which should be rectified in subsequent reports.

KING'S NORTON RURAL.—In addition to recording the number and character of the nuisances abated during 1882, Mr. Clarke comments on the needs of the district so far as concerns his province as a sanitary inspector. Thus, he refers to the numerous complaints made to him of defective refuse removal, and he calls the serious attention of his authority to the necessity of other arrangements being made in this respect. In some portions of the district no provision whatever has been made for the disposal of refuse, and the inhabitants experience considerable difficulty in getting persons to do the work. Altogether 454 nuisances were dealt with, a large number of which arose from defective drains, filthy ashpits, and houses. During the year Mr. Clarke presented fourteen special reports on various subjects to his authority, and a summary of these properly appears in his annual statement.

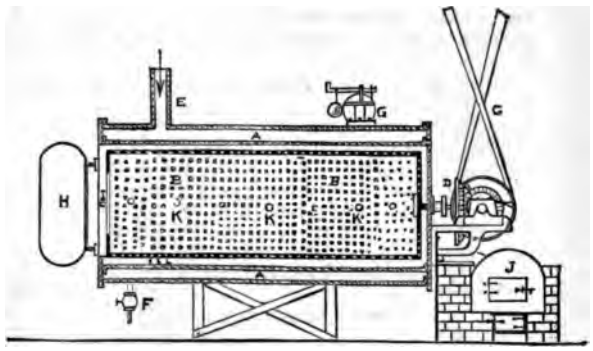
NEWCASTLE.—Mr. T. Clarke, chief inspector of nuisances at Newcastle, has recently issued his second annual report to the sanitary committee of the corporation. He states that during the past year 1,489 complaints (excluding 1,879 relating to ashpits, which were referred to the city engineer) have been received; 8,577 notices to remove nuisances and remedy sanitary defects have been issued; 3,747 special inquiries, &c., have been made; 15,853 houses, let in 23,044 tenements, have been inspected, and 5,757 different works executed. One of the most satisfactory statements in the report is that it has not been found necessary to institute magisterial proceedings against the owners or agents of property, all necessary requirements having been attended to without resorting to compulsion.

ROTHERHAM URBAN.—Rotherham has now an estimated population of 35,547 persons, and the sanitary circumstances of the borough call for active and sustained work. This appears to have been recognised by Mr. Parkin, though it would be better if the purely statistical form of report which he adopts were changed. Excluding ashpit notices, only 64 complaints were received during 1882, although as many as 3,225 houses and premises were inspected. Sixty-five house-drains were repaired, cleansed, and relaid, and 45 were trapped and ventilated. Some improvement was made in the condition of privies and water-closets, and 10 dwelling-houses were provided with a proper supply of water. Refuse removal received attention, 10,708 privies and 5,685 ashpits having been emptied during the year.

RUNCORN RURAL.—Mr. Farrington, the sanitary inspector of this district, has prepared in a convenient form a report of his work during the past three years. He shows that 4,215 yards of main sewers have been constructed, to which 381 houses have been connected; that many improvements have been effected in the drainage, and that a large number of nuisances have been satisfactorily disposed of. Special attention is directed to the question of water supply, which in some parts of the district is far from perfect. Out of 82 samples submitted for analysis, but six were returned as first-class, 24 as very good, one as dilute sewage, and 17 as not fit for domestic use. Fifty-five certificates were granted under the provisions of the Public Health (Water) Act, 1878, having reference to 72 houses. We wish that the experience was more general that 'much credit is due to the landowners, the agents (with one or two exceptions), and the general public, who have had notices served upon them, for the kind and courteous manner in which they have received the same, and the willingness they have displayed in endeavouring to comply with them.'

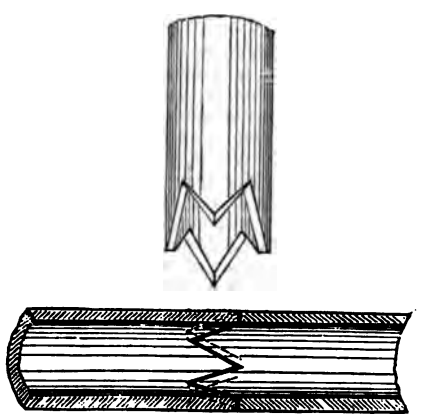
ILLUSTRATED SANITARY PATENTS.

2415. (1883.) APPARATUS FOR DISINFECTING RAGS, &c.: J. ILLINGWORTH, BATLEY, YORKSHIRE. [6*d.*]—This invention has reference to the method to be employed in disinfecting rags, hair, wool, and other fibrous materials. As is well known by flock manufacturers, rags are obtained from all manner of places for the purpose of being made into flocks, and diseases have been spread by infected rags and cloths. The object of this invention is



to provide easy and simple means for disinfecting rags and other fibrous materials, whereby the spread of disease in the manner mentioned is avoided. A is a boiler or double shelled cylinder capable of holding steam at a high pressure. Within the inner cylinder is mounted a cage or perforated cylinder, B, having rotary motion imparted to it from strap, C, and bevil gearing, D. Steam is introduced into the boiler down the pipe E, whilst F shows the outlet for steam and condensed water. The boiler is provided with a safety-valve, G, and also with a steam pressure gauge. Entrance is effected into the cylindrical space by door, H, and into perforated cage, B, by door, I. The boiler is supplied with steam, and, when at a suitable heat —say 280° F.—a quantity of rags or flocks which require disinfecting are placed within the rotary cage, when the doors of both cage and cylindrical chamber are closed and sealed up. A quantity of sulphuric vapour, or other suitable gas from the retort, J, is then admitted into the cylindrical chamber and rotary motion given to the cage, whereby the rags or flocks are carried around and kept in a constant state of agitation, the projecting prongs, K, assisting in this process, as they prevent the materials from gathering in one particular part of the cage by the centrifugal force.

2433. (1883.) JOINTS OF DRAIN-PIPES FOR LAND DRAINING, &c.: D. EDWARDS and T. WILLIAMS, CARDIFF. [4*d.*]—The object of this invention is to provide



efficient means for preventing irregularity and displace-

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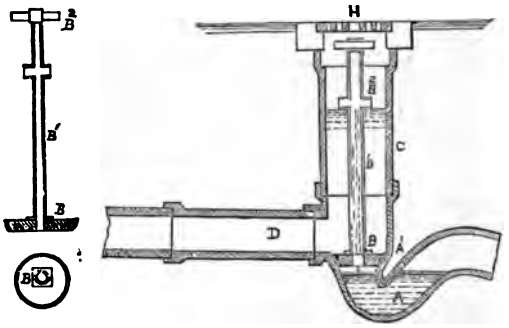
ment of pipes in draining. Great difficulty has been experienced in keeping the pipes even and regular in the drains, especially in soft and loose ground. By this invention means are provided for overcoming this difficulty, and the result is accomplished by making the pipes with scalloped ends, consisting of any number of scallopes or projections of any suitable shape, so as to form a bond in such a manner as to prevent any deflection or irregularity at the joints.

2613. (1883.) TRAPS, &c., FOR FLUSHING AND INSPECTING DRAINS: F. NEWMAN, C.E., RYDE, ISLE OF WIGHT. [6*d.*]—This invention has for its object to provide a simple means in drains for effecting the



periodical flushing and inspection, such means being by preference applied to the traps of drains. Several arrangements are given and we explain one of them. The cut shows a vertical section of a trap A as applied to a drain, having a conical seating formed at A' for the reception of the conical valve B, inserted through the extension C leading up to the ground line. When the valve has been inserted, the liquid flowing from the house through the drain D, accumulates in the drain and in the extension C, so that when the valve is drawn up the head of liquid thus accumulated about it rushes through the trap and into the drain so as to flush these parts. The valve B is provided with a stem or handle B^1, by preference made tubular, lateral openings being provided at B^2 and the passage extended through the valve, so that the handle serves as an overflow, as indicated. Or an overflow passage may be formed in the side wall of the extension C. When the valve B is inserted, the grating at H being removed, the gradual inflow of the liquid from the drain D can be readily inspected to ascertain whether the drain is in proper order. Thus, assuming the valve to fit watertight on its seat, and water to have been admitted to the drain until it stands at the overflow; then, if the water supply be stopped, and the water level in C remains stationary, it will show that there is no leakage in the drain. If, on the other hand, the level sinks it will show that the drain is defective.

2,698. (1883.) IMPROVEMENTS IN CHIMNEY-TOPS AND VENTILATORS: J. WAPLE, BRIXTON, SURREY. [4*d.*]—This invention relates to an improved chimney-top or ventilator, and consists in a combination of apertures and hoods, whereby the wind from whatever quarter it may blow shall be so deflected as to create an upward draught in the chimney or flue. There are two series of apertures in the sides of the chimney-top or ventilator: a lower set—say three in number—of keyhole-form, each inclosed by a hood of approximately corresponding form open at the bottom; and an upper series entirely uncovered. The chimney-top or ventilator may be made in metal or earthenware, and would be provided at its base with flanges for securing the same in position. The invention is illustrated in the accompanying cuts, wherein fig. 1 shows the chimney-top or ventilator in elevation; fig. 2, a horizontal section on line 1, 1, fig. 1; while fig. 3 is a vertical section. The lower apertures, *a*, are of keyhole-form, and each provided with a hood, *b*, of approximately corresponding form. These hoods, which are open at the bottom, project about one inch from the surface of the chimney-top or ventilator; and they are rounded off exteriorly, and brazed or soldered to the chimney-top when of metal, or, in the case of earthenware

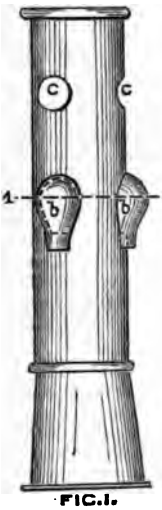


FIG. 1.

FIG. 3.

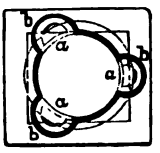


FIG. 2.

formed in one therewith. The upper apertures, *c*, are uncovered. The two sets of apertures should be substantially the distance apart represented in the drawing

2,967. (1883.) IMPROVEMENTS IN STENCH TRAPS: J. E. MANOCK, HEYWOOD, LANCASHIRE.—This invention

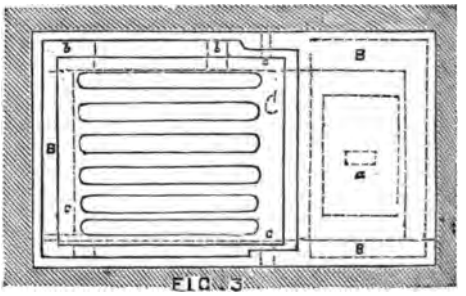


FIG. 3.

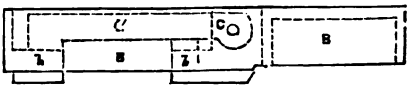


FIG. 1.

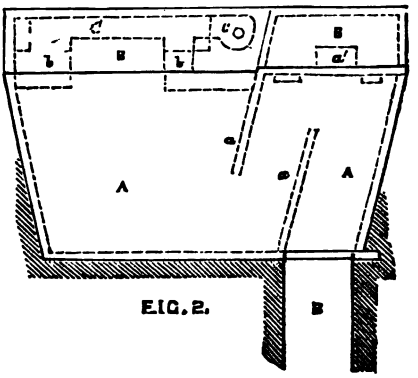


FIG. 2.

relates to improvements in the construction of stench traps, and consists in the forming of the 'box' in pa

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so that the top or upper portion thereof carrying the 'grid' may be separate or apart from the lower portion carrying the 'trap,' but so that it may lie steadily and firmly thereupon when in position, and so that the upper portion may be capable of removal and renewal, if injured, without disturbing the lower portion. In fig. 1, which is a side view, B B is the framework of the loose top, and is cast so as to carry a grid C, which lies upon four flanges cast thereupon, two of which are shown at *b b*, and which is also hinged thereto at *c*, so as to be capable of opening and shutting. In fig. 2, which is a side view in position, A A is the framework of the lower portion of the box carrying the trap, and is provided with a partial bottom and also with a partial top, in which latter is an aperture upon which fits a lid a^1, and it is also provided with two partition sides, one of which rises from the bottom and the other drops from the top, shown at *a a*, and so that they form a 'trap.' A flange cast on the bottom of the framework ensures its steadiness when set in position, and forms a good joint with the top of the drain as shown at D. The loose top B B, carrying the grid is shown lying in position upon the upper rim of the lower portion A A, carrying the trap, and is kept steady thereupon by four snugs. In fig. 3, which is a top view, B B is the framework, C C is the grid, and *b b* are the flanges respectively of the aforesaid loose top when lying in position upon A A, and as viewed from above.

2,969. (1883.) IMPROVEMENTS IN WATER-CLOSET BASINS: R. MCCOMBIE & W. SEAMAN, PADDINGTON, MIDDLESEX. [6*d*.]—This invention has for its object improvements in water-closet basins, whereby the water is

FIG. 1. FIG. 3.

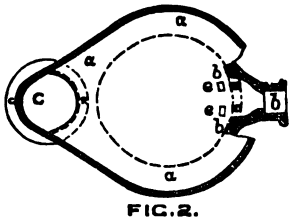

FIG. 2.

made to act more efficiently in cleansing the basin, and space is provided for a seat-bearer above the 'arm.' Fig. 1 is a longitudinal section. Fig. 2 is a horizontal section. Fig. 3 is a cross section. *a* is the body of the basin, *b* is the 'arm' which is placed immediately opposite the outlet aperture *c*, and a suitable distance below the rim of the basin so as to afford space above the same for a seat-bearer and the water entering the 'arm' *b*, instead of issuing therefrom into the basin through a flushing rim is caused to issue therefrom into the basin by a series of apertures formed in the side thereof, so that the chief supply of water is directed into the basin through apertures *d*, *d*, *d*, at or near the level of the water standing therein. Other supplies of water are caused to enter the basin above and below the level of the water therein: that entering the apertures *e*, *e*, being employed to drive the soil and other contents of the basin into the current of the chief supply coming through the apertures *d*, *d*, *d*; and the sides of the basin being washed by a douche *f*, formed above the aforesaid apertures *d*, *d*, *d*. All such supplies of water are so directed into the basin as to cause a strong current towards the outlet aperture *c*, thereby securing a speedy discharge from the basin together with efficient cleansing action. The outlet aperture, *c*, is formed much larger than usual at its connection with the basin, as shown more clearly at fig. 2; and it is gradually reduced to the required dimensions at its junction with the trap, and the top of such outlet is carried from the basin at such an angle as to throw the water striking it into the trap below.

3013. (1883.) IMPROVED STENCH TRAPS FOR DRAINS, &c.: W. AYRES, LONDON. [6*d*.]—This invention has for its object the construction of stench traps so that no noxious gases can take place therefrom. At the same time, the trap admits of the free passage downwards of fluid matters into the drain. Fig. 1 shows a perspective

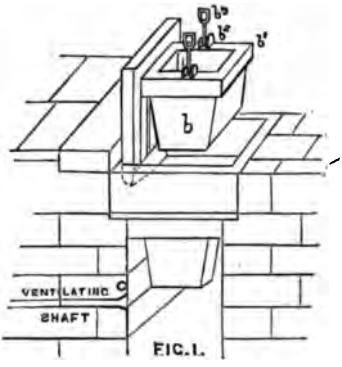

FIG. 1.

STREET GULLEY IN SECTION.

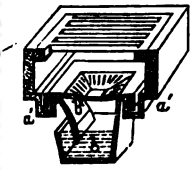

FIG. 2.

view of a street gully stench trap with the trap lifted. Fig. 2 is a section in perspective of the same trap when placed in position below the grating. *a a* is the trap frame formed with a channel groove or gutter a^1 around its inner surface, *b* is the trap formed with flanges b^1 on its outer upper edge which drop into the channel a^1 of the frame *a*. The channel groove or gutter a^1 is then filled with water or other fluid (or it may contain sand or other material) to form a water or other air tight joint so as to seal the trap effectually and thus cut off all communication between the under side of the trap and the external atmosphere. Lugs $b^2 b^2$ (as shown in Fig. 1) may be formed on the trap for lifting it out of position when required by the jointed rods or hooks b^3 b^3, or other suitable means may be employed for this purpose. $b^\times$ is a loose grating, *c* is a pipe or passage connected with a vertical shaft for ventilating the drain.

3225. (1883.) WATER-WASTE PREVENTERS, E. RAITT, BRIXTON, SURREY. [6*d*.]—The objects of this invention are to produce a water-waste preventer for closets, urinals, &c., from which the water is discharged by the oscillation of the vessel in which the water is contained, and to effect this discharge without putting any undue strain on the ball supply valve lever while at the same time the apparatus is certain in its operation and effectual in preventing leakage and waste of water. In addition to the flush which is at the first delivered an effectual after-flush is also provided by the same action.

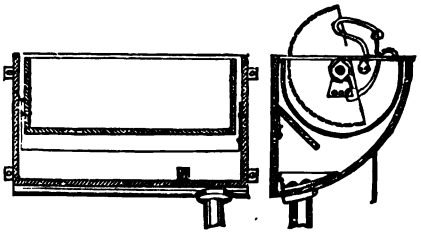

FIG. 2 FIG. 1.

The action is as follows. The oscillating vessel being empty and in a level position the water passage is formed to the ball valve which admits the water until the vessel is sufficiently filled and the ball valve shuts off the supply. The pull then inclines the vessel and empties the water out of the same into the cistern. Immediately the vessel is inclined the opening in the casting no longer corresponds with the opening in the pipe, and no water therefore can

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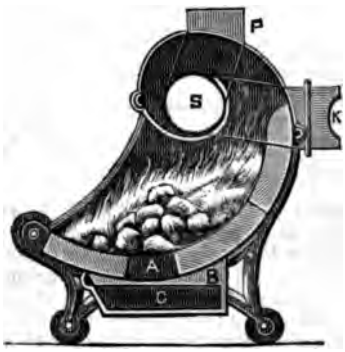
enter until the vessel is brought back to its former position. The water which has been emptied into the cistern passes away by the discharge pipe and effects the flush, but when the cistern is so constructed a certain proportion of the water is retained by the transverse midfeather or partition which afterwards passes away slowly through the holes and gives the required after-flush.

NEW INVENTIONS.

THE NAUTILUS GRATE.

BELOW is figured an improvement recently adopted in the well-known Nautilus grates, with which they are now fitted, without extra charge, unless especially ordered without it.



The improvement will be readily understood by referring to the above illustration: A is a small grating about 3 inches wide by the width of the grate; B is a guard or case suspending the ash-pan, C, which may be drawn out at the front, and should of course be emptied each morning. The grating does not materially alter the slow-combustion principle of the fire, it being only large enough to allow the fine ash to drop down into the concealed ash-pan. The cheerful appearance of the Nautilus grate and its heating qualities are considerably increased by this alteration, so that it cannot be surpassed for cleanliness and economy. Those who have tried the grating appreciate it very highly, and the manufacturer, Mr. James B. Petter, of Yeovil, considers it so decided an advance that he has taken out a second patent for it.

Our readers will have an opportunity of examining the Nautilus grates at the forthcoming International Health Exhibition, Mr. Petter having arranged to show the different forms in which they are made, with one in action.

HYGIENIC SWEETS.

WE have received a number of samples of the preparations of the Hygienic Sweet Manufacturing Company, 29 and 31 New Oxford Street. The object of this company is to prepare sweetmeats containing medicinal drugs in a form sufficiently attractive not only to render the administration of medicine more palatable, but so that the sweetmeats may be even used for dessert. The variety they are manufacturing is certainly sufficient to recommend them to the notice of all who are interested in the pleasant administration of somewhat unpleasant remedies. Wormwood, horehound, aniseed, and other herbs appear largely in their preparations, and as their object is to a great extent to appeal to the taste of children, extract of malt, honey, and fruit syrups are judiciously added both for dietetic and flavouring purposes. We can hardly go so far as to say that all these preparations are palatable, because to imagine them so to the taste of a person of mature age would certainly suggest that the makers had forgotten to add the active ingredients after which the sweetmeats are named, but we can say they are as pleasant in taste as it is well possible to make such substances, and that for portability and general purity they are worth recommending to those to whom such preparations would be useful.

The preparation marked Cachouleen, which is said to be particularly suitable for smokers, has an agreeable flavour; it is put up in a convenient and portable form which will no doubt recommend itself to those who wish to remove the unpleasant odour of the breath after indulging in the cigar or pipe.

CORRESPONDENCE.

[All communications must bear the signature of the writer, not necessarily for publication.]

VENTILATION.

In the issue of the SANITARY RECORD for March last Mr. Buchan kindly notices that if my system of ventilation will act and do what I claim for it, it ought to be widely adopted; but the worst of it, he says, is that patentees and inventors recommend their systems as infallible cures for the evils they propose to cure, and thus mislead the public.

Holding myself above such artifices, and only thoughtful for the public good, I will in the first place ask Mr. Buchan, before he promulgates innuendoes, Is he qualified to give an opinion on the matter of ventilation? or does he understand common natural laws as to heat, cold, &c., &c. ? If so, he ought not to advance such erratic ideas as he does, and which I will point out to him as we proceed.

We all know that all heated air will ascend, so will smells—as, to wit, a smell from the kitchen. Well, this heated and polluted air, whether in the ball-room, theatre, church, chapel, or bedroom, will ascend to the ceiling. Not getting out there, it accumulates in thickness till it reaches the heads of the inhabitants or frequenters of such rooms, when they at once call out (if not overpowered) about the dreadful want of ventilation. Let this hot air out, and induce it at the same time also to ascend the flues made for such purpose, and you have got rid of, in a simple and natural manner, the nuisance so long and constantly complained of. The bad air and the fresh air will come in of itself, nature abhorring a vacuum. You thus have a constantly renewed atmosphere without draught—the required article.

Mr. Buchan says he thinks I claim too much for my system. In his opinion he may be right, but not in the opinion of others, notably some of the largest manufactures in Lancashire, Ryland & Son, and John Heywood, men who having used it extensively, are competent to give an opinion on the matter, and who, for the future, will use no other. Architects will do the same; in fact, to all thinking minds the system is self-evident.

Mr. Buchan is evidently wrong when he says use the chimneys to lead the foul air into. With him such practice may do, not with me, for if the chimney smokes his ventilators produce volumes of soot and smoke where they are not required, viz. in the rooms. 2. To put a ventilator into a chimney is simply confusion. If the same practice in pump barrels were adopted it would simply preclude suction of any sort.

As to expense, it is the cheapest method yet brought before the public; thus, all houses must have a ridge, then why not the ventilating ridge which will thoroughly and permanently ventilate all rooms in a house, besides being an ornament to the house, and lasting with the ventilator as long as the edifice. This is natural ventilation in contradistinction to mechanical excrescences on the roof, which are not only ugly, but liable to the laws of nature—premature decrepitude and ultimate decay. Besides, architects now object to such excrescences as Buchan's, Boyle's, and similar eruptions on roofs otherwise faultless.

HARCOURT THOMPSON, C.E.

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THE HOUSING OF THE POOR.

THE HOMES OF THE POOR IN SOUTHWARK.—A public meeting was recently held at the Vestry Hall, Borough Road, Southwark, under the presidency of Mr. F. J. Robins, to protest against the delay which has taken place in making the new street from the Mint to Southwark Bridge Road, and also to call the attention of the Metropolitan Board and the Artisans and Labourers' Dwellings Company to the urgent necessity of building upon the vacant land in Mint Street, seven acres in extent. Resolutions were passed in accordance with the objects of the meeting, and also in favour of legislation providing compensation for weekly tenants evicted for the purposes of public utility. Mr. Cohen, M.P., said that the Metropolitan Board of Works had treated the people of Southwark very badly with respect to these improvements. They had very seriously injured the trade of the localities where their operations had been commenced by their delay; and in clearing sites without making provision for the poor people who were evicted, caused overcrowding. He knew there were difficulties to contend with, but the railway company, who were about to commence to pull down houses must make provision for the poor by the erection of suitable dwellings in the place of those removed. He hoped that a measure for providing compensation would be passed, but it could only at the most be of a very small character, and therefore it was of the utmost importance that the people should be provided for in the neighbourhoods where they earned their living. A vote of thanks to the chairman brought the proceedings to a close.

A CONFERENCE has been held in the great hall of the Society of Arts, John Street, Adelphi, to consider a proposal for forming a limited liability company to build suitable dwellings for the labouring poor on a site offered in Southwark. Sir Thomas Chambers, Q.C., M.P., Recorder of the City of London, presided, and among those present were Mr. R. K. Causton, M.P., Mr. W. Shean, M.A., Dr. J. H. Gladstone, F.R.S., Mr. John J. Stevenson, the Rev. G. M. Murphy, Mr. Edric Bayley, Mr. William Jones Loyd, Mr. John Westlake, Q.C., Miss Vernon (hon. sec.), Mrs. Kelly, and Mrs. Hinckworth Scott. The chairman observed that although a Royal Commission had been appointed to inquire into the subject and to report upon it, there was plenty of scope for private effort. Mr. John Westlake, Q.C., read the report presented by the committee appointed at a meeting, held Dec. 13, 1883, at the chairman's invitation, to prepare a scheme for building an improved set of dwellings in Southwark, and moved its adoption, with a request to the committee to take steps for carrying out the scheme therein proposed. The report stated that the committee, finding the artisans' dwellings erected by existing companies not adapted either to the wages or habits of the poorer class, who are constantly being turned out of their homes for metropolitan improvements, thought that for such tenants the simplest kind of construction must be used, a site must be got at a reasonable cost, rents must not exceed an average of 2*s.* a week a room, and must be collected, on Miss Octavia Hill's system, by trained volunteers. They had been offered a site at cost price by the Improved Industrial Dwellings Company, who had sunk upon it about 10,000*l.* Upon this, at the cost of 20,000*l.* more, it was proposed to build 400 rooms in two blocks, leaving large courts facing south for air and light. It was recommended that this site be purchased, and a limited liability company formed, with a capital of 30,000*l.*, which was estimated to yield, after the first year, safe annual dividends of 3½ per cent. The motion was unanimously carried.

AT a meeting of the Willington Quay Local Board, held on the 19th ult., the surveyor reported that the property in Church Street, belonging to the Newcastle Corporation, was in a bad state, the roof in several places being open to the sky, whilst the floor is giving way, being very damp. The houses were unfit for habitation.

A CORRESPONDENT of the *Newcastle Daily Chronicle* recently showed that the corporation of that city have unhoused, within the past twenty years, at least 2,000 persons belonging to the labouring class; for whom they have provided no house accommodation whatever.

DR. BROWN, the medical officer of the Blaydon Local Board, reports that he has paid official visits to certain property at Swalwell, part of which is inhabited by persons in such abject poverty and filthiness as to constitute the dwellings the veriest hotbeds of contagion. During the prevalence of zymotic disease in the district the inhabitants of these rookeries owed their salvation in no small degree to the stream of water that ran down the middle of the street. The only compunction he felt against urging the entire demolition of these places was the difficulty of finding suitable dwellings in the neighbourhood for the poor people they would have to evict. As the property was commercially worthless, the owner was quite willing that it should be pulled down, provided the people could find accommodation elsewhere.

PARKS AND OPEN SPACES.

MR. CARNEGIE, of New York, has offered Dunfermline Town Council the sum of 1,000*l.* to be expended on the baths which he presented to the town.

THE KYRLE SOCIETY.—At a recent meeting of this society, held under the presidency of the Duke of Westminster, at Grosvenor House, Miss Octavia Hill read a paper having special reference to the aims, work, and progress of the society. Miss Hill referred to the largest and most costly branch of the Kyrle Society's work viz., that of providing open spaces. She mentioned that during the past year three disused burial-grounds had been handed over to the society to be laid out previously to their being taken over by the several vestries of the parishes in which they stood. Funds amounting to 700*l.* had been collected, which would enable the society to complete all three. Arrangements had just been made that they should take over and open to the public another such garden in a very crowded neighbourhood in the south of London, as soon as the Kyrle Society had laid it out. This would cost about 300*l.*, of which 50*l.* was in hand. Fountains, gold fish, aviaries of birds, summer-houses, invalid chairs to be borrowed to bring delicate women or children from their homes to the gardens, periodicals to be lent by the gatekeeper, shrubs and flowers, were among the welcome gifts to furnish these recreation grounds which had been received and of which more could be used. Besides the living colour of flowers, they were trying to introduce inscriptions in permanent mosaic on the blank walls which often bounded the gardens. Miss Hill then referred to the importance of providing these open spaces in connection with the question of the over-crowding of the homes of the poor, and expressed the hope that the Disused Burial Ground Bill and the Metropolitan Buildings Act would be passed this year. Referring to the homes of the poor, she concluded by advising her friends to see first that the homes of the poor were not bolstered up with gifts; and, secondly, she might add that much had been said lately of her plan of managing houses for the poor. There was, however, no plan in it at all. Some technical knowledge was needed, it was true; but success mainly depended upon the business capacity of those who undertook such work.

EXHIBITIONS.

INTERNATIONAL HEALTH EXHIBITION, LONDON.

HIS ROYAL HIGHNESS the Duke of Cambridge, K.G., has consented to open this Exhibition, on behalf of the President, His Royal Highness the Prince of Wales, on Thursday, May 8, at noon.

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SANITARY JOTTINGS.

SANITARY.

CONSIDERABLE uneasiness and trouble have occurred at the Newcastle Infirmary in consequence of the epidemic of small-pox which has recently broken out at that institution. Notwithstanding the energetic efforts of the medical board to prevent the spread of the disease by the re-vaccination of all connected with the infirmary, and the refusal of admission to visitors, except in special cases, and other desirable precautions, it is reported that some of the students and nurses have been attacked with the disease.

Arrangements have been made for holding another Sanitary and Industrial Exhibition at Sunderland during Easter week. Gold, silver, and bronze medals will be given for the best exhibits of various classes. Cookery lectures will be delivered in the afternoons and evenings.

For the fortnight ending March 29 there were 28 cases of small-pox and 67 cases of scarlet fever notified to the Medical Officer of Health for Newcastle.

The Philadelphia Association of Master Plumbers have resolved to maintain a plumbing trade school, in which the art and practice of plumbing may be taught. This school was inaugurated at a public meeting on Feb. 18.

Some idea of the terrible ravages of small-pox in Madras may be obtained from the fact that during the months of February and the last three weeks of January 1,200 deaths occurred within the municipal limits.

WATER SUPPLY.

The Alnwick Local Board are in negotiation with Sir J. Swinburne for procuring a supply of better water than they can at present command. The proposed source of supply is the Senna Wells on the above gentleman's estate. Though the name may not be agreeably suggestive, an analysis of the water shows it to be of exceptional purity, very soft, and well suited for domestic purposes. In the opinion of Mr. Newbigin, the analyst, it is so soft that, in the question of soap, its use would prove a great saving to the ratepayers.

The West Cowes Local Board and Urban Sanitary Authority have held a special meeting to discuss the propriety of running off the water from one of their reservoirs, in consequence of a man named Burton having committed suicide by drowning in it, a few days previously. They decided not to do so, owing to the difficulty of procuring more for the ensuing summer supply. This seems a somewhat singular decision under the circumstances, and it is to be hoped that the inhabitants of West Cowes are not inclined to be particular about trifles.

WATER RATES.—The water-rate is, under the Act of 1847, to be 'payable according to the annual value of the tenement supplied with water.' This is in general the case, unless the 'special Act' of the company directs otherwise. To put an end to all controversy as to the meaning of this provision, Mr. Torrens, M.P., has introduced a Bill directing that the value here referred to shall be the 'net annual value as settled from time to time by the local authority as duly constituted.'

PERSONAL.

At the last meeting of the Gateshead Town Council, Dr. C. Green tendered his resignation as medical officer of health; it was accepted with regret.

LEGAL.

At the Clerkenwell Police-court, Henry Fincham, of 150 Euston Road, has been summoned at the instance of the New River Company for having 'wilfully or negligently caused or suffered certain water fittings, a ball valve, cistern, and lead pipe to be out of repair, so as to cause a waste of the water supplied, contrary to the 32nd section of the Metropolis Water Act, 1871.' The defendant was ordered to pay a fine of 50s., and costs.

APPOINTMENTS UNDER THE PUBLIC HEALTH ACT.

MEDICAL OFFICERS OF HEALTH.

ABBOTT, Charles Edward, L.K.Q.C.P.Irel. and L.M., M.R.C.S. Eng., has been re-appointed Medical Officer of Health for the Braintree Rural Sanitary District, at £150 for one year.

BILLIALD, Richard Atherstone, L.R.C.P.Lond., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Kington Urban Sanitary District, Herefordshire, at £20 for the year ending March 25, 1886.

CAPE, Joseph Thomas, M.R.C.S Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Totnes Rural Sanitary District, at £100 for one year.

CLENDINNEN, Joseph George, L.R.C.S.Irel., L.A.H.Dub., has been re-appointed Medical Officer of Health for Coseley Urban Sanitary District, Staffordshire, at £50 per annum, for three years.

DENHAM, Thomas Reid, M.D.Qu.Univ.Irel., has been re-appointed Medical Officer of Health for the Wigton Urban Sanitary District, at £40 for three years.

EATON, James William, L.R.C.P.Lond., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Bingham Rural Sanitary District, at £50 for one year.

FISHER, John Beil, M.B., C.M.Univ.Edin., has been appointed Medical Officer of Health for the Whitehaven Rural Sanitary District, at £80 per annum, *vice* Syme, deceased.

GRAY, Frederick Archibald, L.R.C.P.Lond., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Ottery St. Mary Urban Sanitary District, at £20 for one year.

GREAVES, Henry, L.S.A.Lond., has been re-appointed Medical Officer of Health for the Ashborne Urban Sanitary District, Derbyshire, at £10 for one year.

HAILEY, C. Collison, L.R.C.P.Edin., M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Newport Pagnell Rural Sanitary District, at £80 for one year.

HATTON, John, L.R.C.P.Edin., M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Coleford Urban Sanitary District, at £20 for one year.

HICKS, Edward Buller, L.R.C.P.Lond., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Easingwold Rural Sanitary District, Yorkshire, at £40 for one year.

HILLIARD, Robert Harvey, M.D.Univ.Glasg., L.F.P.S.Glasg., and L.M., has been re-appointed Medical Officer of Health for the Aylesbury Rural Sanitary District, at £100 for one year.

HOFFMEISTER, William, M.D., L.R.C.P.Lond., has been re-appointed Medical Officer of Health for the West Cowes Urban Sanitary District, and the Cowes Port Sanitary District, at £40 for one year.

LYONS, Alfred de Courcy, M.B.C.M.Aberd., L.R.C.P.Lond., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Axbridge Rural Sanitary District, at £100 per annum for three years.

MACKINTOSH, Angus, M.D.Univ.Glasg., L.F.P.S.Glasg., has been re-appointed Medical Officer of Health for the Chesterfield Rural Sanitary District, at £350 for one year.

MURPHY, William Ponsonby, L.R.C.S.Irel., and L.M., L.S.A Lond., has been re-appointed Medical Officer of Health for the Wigton Rural Sanitary District at £80 for one year.

ROBERTSON, John, M.D.Univ.Edin., L.R.C.S.Edin., and L.M., has been re-appointed Medical Officer of Health for the Cockermouth Rural Sanitary District, at £150 for one year.

SHEPARD, Alexander John, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Usk Urban Sanitary District, Monmouthshire, at £12 for one year.

SKIMSHIRE, Charles Parnham, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Brynmawr Urban Sanitary District, at £40 for the year ending Lady Day 1885.

VERNEDE, Frederick Edwin, L.R.C.P.Edin., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Poole Port Sanitary District for one year.

WOOD, John, M.B.Oxon., L.R.C.S.Edin., L.S.A.Lond, has been re-appointed Medical Officer of Health for the Walsall Rural Sanitary District, at £100 for one year.

SURVEYORS, CLERKS TO GUARDIANS, INSPECTORS OF NUISANCES, &c.

ABELL, Mr. George E., has been appointed Treasurer to the Pershore Guardians and Rural Sanitary Authority, *vice* Mr. Martin Abell, deceased.

AMOS, Mr. Henry, has been appointed Surveyor and Inspector of Nuisances to the March Local Board and Urban Sanitary Authority, at £80 per annum, *vice* Grounds.

ANGELL, Mr. Arthur, has been re-appointed Public Analyst for the Borough of Guildford for three years.

BOVEY, Mr. John, has been re-appointed an Inspector of Nuisances for the Totnes Rural Sanitary District, at £35 for one year.

BRANSON, Mr. George William, has been re-appointed Surveyor and Inspector of Nuisances to the Newport Pagnell Rural Sanitary District, at £200 for one year.

BRODIE, Mr. John Shanks, has been appointed Surveyor and Engineer to the Whitehaven Improvement Commissioners and Urban Sanitary Authority and Harbour Trustees, at £300 per annum, *vice* Pickering, resigned.

BROWN, Mr. Joseph William, has been appointed Surveyor to the West Hartlepool Improvement Commissioners and Urban Sanitary Authority, at £400 per annum, *vice* Scott, retired.

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BRUTTON, Mr. Edward James, has been re-appointed Clerk to the Ottery St. Mary Local Board and Urban Sanitary Authority, at £35 for one year.

BRYANT, Mr. J. E., of the Staffordshire Joint Stock Bank, has been appointed Treasurer to the Bilston Improvement Commissioners and Urban Sanitary Authority, *vice* Miller.

BUTTERWORTH, Mr. Robert, has been re-appointed Inspector of Nuisances for the Chesterfield Rural Sanitary District, at £200 per annum.

CARNELL, Mr. Thomas John, has been re-appointed Collector to the Ottery St. Mary Local Board and Urban Sanitary Authority, at £25 for one year.

CASSALL, Mr. Charles E., F.C.S., F.I.C., has been appointed Public Analyst for the Borough of Chepping-Wycombe, Bucks, at 10*s.* 6*d.* for each quarterly report, 10*s.* 6*d.* for each ordinary analysis, 21*s.* for each analysis of water, and 21*s.* and 3*d.* per mile, for each compulsory attendance as a witness, *vice* Wanklyn.

COOPER, Mr. T. M., has been appointed Collector of general district rates to the Gainsborough Local Board and Urban Sanitary Authority, at £70 per annum.

COTTLE, Mr. Thomas, has been appointed Inspector of Nuisances for the Northfield Division of the King's Norton Rural Sanitary District, Worcestershire, at £90 per annum from year to year, *vice* Clarke, whose appointment has expired.

CROSTHWAITE, Mr. J., has been re-appointed Inspector of Nuisances for the Wigton Rural Sanitary District, at £75 for one year.

CUTTS, Mr. W., has been re-appointed Collector to the Ripley Local Board and Urban Sanitary Authority, Derbyshire, at £15 for one year.

DAVY, Mr. John, has been re-appointed Inspector of Nuisances for the Hoxne Rural Sanitary District, Suffolk, at £60 for one year.

GABB, James Percy Alwyne, M.D.Lond., M.R.C.S.Eng., of Guildford, has been appointed a Certifying Surgeon under the Factory and Workshop Act, *vice* Stedman, resigned.

GARBETT, Mr. J., has been re-appointed Inspector of Nuisances for the Walsall Rural Sanitary District for one year.

GOFTON, Mr. John Glaves, has been appointed Clerk to the Filey Local Board and Urban Sanitary Authority, Yorkshire, at £25 per annum, *vice* White, deceased.

GREENWAY, Mr. Frederick, has been appointed Surveyor and Inspector of Nuisances to the Stapleton Local Board and Urban Sanitary Authority, Gloucestershire, at £100 per annum.

GRESSWELL, Mr. Charles, has been re-appointed Treasurer to the Ottery St. Mary Local Board and Urban Sanitary Authority, at £10 for one year.

HANCOCK, Mr. A., has been appointed Collector of Water Rents to the Gainsborough Local Board and Urban Sanitary Authority, at £50 per annum.

HENDERSON, Mr. James Alexander, has been appointed Surveyor and Inspector of Nuisances for the Coleford Urban Sanitary District, at £32 10*s.* for one year.

HILLIER, Mr. Thomas, has been appointed Surveyor to the Kenilworth Local Board and Urban Sanitary Authority, at £20 per annum.

HOUGHTON, Mr. John, has been appointed Inspector of Nuisances for the King's Norton Division of the King's Norton Rural Sanitary District, at £90 per annum, from year to year, *vice* Clarke, whose appointment has expired.

JOHNSON, Mr. Christopher, has been appointed Inspector of Nuisances for the Auckland Rural Sanitary District, at £130 per annum, *vice* Robson, whose appointment has expired.

JONES, Mr. Edward W. T., has been re-appointed Public Analyst for the Borough of Wolverhampton for one year.

LAVINGTON, Mr. Thomas R., has been appointed Treasurer to the Andover Guardians and Rural Sanitary Authority.

MANN, Mr. Charles, has been appointed Collector to the Brownhills Local Board and Urban Sanitary Authority, Staffordshire, at £75 per annum, *vice* Trubshaw, resigned, but whose appointment has been continued to June 24 next, when Mr. Mann's duties will commence.

MARKS, Mr. Richard George, has been re-appointed Inspector of Nuisances for the Aylesbury Rural Sanitary District, at £150 for one year.

MAY, Mr. Edward Stephen, has been re-appointed Inspector of Nuisances for the Ramsgate Urban Sanitary District, at £150 per annum, for five years, from March 18.

MOTHERSDALE, Mr. J., has been appointed Treasurer to the Shaftesbury Guardians and Rural Sanitary Authority, and to the Tisbury Guardians and Rural Sanitary Authority, *vice* Macklin, resigned.

MUNDAY, Mr. Richard White, has been re-appointed Surveyor to the Corporation and Urban Sanitary Authority of Buckingham, at £50 for one year.

PONTING, Mr. Francis William, of the Preston Banking Company, has been appointed Treasurer to the Fleetwood Improvement Commissioners and Urban Sanitary Authority, *vice* Horsfall.

ROSSER, Mr. David, has been appointed Surveyor, Surveyor of Highways, Inspector of Nuisances, Manager of the Water Works, and Superintendent of the Fever Hospital, to the Bedlingtonshire Local Board and Urban Sanitary Authority, Northumberland, at £130 per annum, *vice* Hogarth and Fenwick, whose appointments have expired.

SARGEANT, Mr. James Albert, has been re-appointed Inspector of Nuisances for the West Cowes Urban Sanitary District, and the Cowes Port Sanitary District, at £80 for one year.

SQUIRE, Mr. Robert, has been re-appointed Surveyor and Inspector of Nuisances to the Ottery St. Mary Local Board and Urban Sanitary Authority, at £36 for one year.

TREPESS, Mr. Francis Pickard, has been appointed Inspector of Nuisances for the Warwick Urban Sanitary District, at £32 per annum for two years, *vice* Bullock, whose appointment has expired.

WATSON, Mr. Richard Harris, has been re-appointed an Inspector of Nuisances for the Totnes Rural Sanitary District, at £35 for one year.

WATSON, Mr. W. A., has been re-appointed Inspector of Nuisances for the Staines Urban Sanitary District for one year.

WILLSON, Mr. John, has been appointed Surveyor and Inspector of Nuisances to the Ashford Local Board and Urban Sanitary Authority, at £120 per annum, from year to year, *vice* Robinson, resigned.

WISHLADE, Mr. Henry, has been re-appointed Inspector of Nuisances for the Kington Urban Sanitary District, Herefordshire, at £15 per annum, from May 1.

WRIGHT, Mr. John Wilkinson, has been re-appointed Inspector of Nuisances for the Bingham Rural Sanitary District, at £70 for one year.

VACANCIES.

MEDICAL OFFICER OF HEALTH for the Alton Rural Sanitary District, £80 per annum for three years, from July 1. Application, 23rd inst., to W. H. Moss, clerk.

MEDICAL OFFICER OF HEALTH for the Grange Urban Sanitary District, Lancashire.

MEDICAL OFFICER OF HEALTH for the Hay Rural Sanitary District. Application, 23rd inst., to Charles Griffiths, clerk.

MEDICAL OFFICER OF HEALTH for the No. 1 Division of the Wycombe Rural Sanitary District.

MEDICAL OFFICER OF HEALTH for the Camborne Urban Sanitary District.

MEDICAL OFFICER OF HEALTH for the Hayle Urban Sanitary District.

MEDICAL OFFICER OF HEALTH for the Helston Rural Sanitary District.

MEDICAL OFFICER OF HEALTH for the Redruth Rural Sanitary District.

MEDICAL OFFICER OF HEALTH for the Redruth Urban Sanitary District.

MEDICAL OFFICER OF HEALTH for the Phillack Urban Sanitary District.

TREASURER to the Sandgate Local Board and Urban Sanitary Authority.

TOWN CLERK, and Clerk to the Urban Sanitary Authority of Peterborough.

CLERK to the Smallburgh Guardians and Rural Sanitary Authority, Norfolk. £125 per annum as Clerk to the Guardians, about £75 per annum as Clerk to the Rural Sanitary Authority and to the Assessment and School Attendance Committees, and fees as Returning Officer and Superintendent Registrar of Births, &c. Application, 16th inst., to the Chairman, Union Workhouse.

CLERK to the Aberayron Guardians and Rural Sanitary Authority, Cardiganshire.

SURVEYOR to the Walker Local Board and Urban Sanitary Authority, Northumberland. Application, 17th inst., to Thomas M. Sturgess, Clerk, 34 Collingwood Street, Newcastle-on-Tyne.

SURVEYOR and INSPECTOR OF NUISANCES to the Thame Local Board and Urban Sanitary Authority.

SURVEYOR to the Aston Manor Local Board and Urban Sanitary Authority, Warwickshire.

SURVEYOR to the Aston-Manor Local Board and Urban Sanitary Authority, Warwickshire; £200 per annum. Application, 17th instant.

LOCAL INTELLIGENCE.

THE Faversham Improvement Commissioners and Urban Sanitary Authority have been continued the Port Sanitary Authority for the ensuing year, by order of the Local Government Board.

The Bexhill Parochial Authorities have received an intimation from the Local Government Board that they will issue a Provisional Order constituting it a Local Government Board.

The Maidstone Local Board and Urban Sanitary Authority have added £25 per annum to the salary of Mr. Charles Beale, the Inspector of Nuisances.

The Bath Town Council and Urban Sanitary Authority have increased the salary of Dr. Anthony Beaufort Brabazon, the Medical Officer of Health, from £125 to £180 per annum, and appointed him medical officer to the Infirmary for Infectious and Contagious Diseases, at £45 per annum.

The Poole Town Council and Urban Sanitary Authority have increased the salary of Mr. John Elford, the surveyor, from £150 to £180 per annum.

The Chesterfield Guardians and Rural Sanitary Authority, in reappointing Dr. Mackintosh Medical Officer of Health, have reduced his salary from £400 to £350 for one year.

Mr. Arthur Wright has been presented with a silver tea and coffee service of the value of £40 as a token of respect and esteem, on retiring from the clerkship of the Oldbury Local Board and Urban Sanitary Authority. The presentation was made by Mr. B. T. Sadler, the chairman of the Local Board, on behalf of the subscribers, at a public meeting.

The Local Government Board have intimated to the local sanitary authorities, that having regard to the opposition and to the circumstances of the case, they will not further press for a conjoint appointment of a Medical Officer of Health for the Camborne Urban, the Hayle Urban, the Helston Rural, the Phillack Urban, the Redruth Rural, and the Redruth Urban, sanitary districts, at present.

Mr. W. H. Wellsted has obtained an award of £1,400 as compensation for the loss of his appointment as surveyor to the Newington,

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Yorkshire, Local Board, upon the latter being dissolved, and the district added to the Urban Sanitary District of Kingston-upon-Hull.

The Dorking Guardians and Rural Sanitary Authority have been invested with urban powers under Sects. 157 and 158 of the Public Health Act, within the contributory place of Dorking, being a portion of the Rural Sanitary District, from the 21st inst.

At Southwell, Notts, a statutory meeting of owners and ratepayers has been held, Mr. Thomas Barber, the senior churchwarden and summoning officer in the chair, at which a resolution 'That it was expedient that the parish should be constituted a Local Government district,' was negatived by 40 votes against 33. A poll was, however, demanded.

SUGGESTIONS FOR REGULATIONS WITH RESPECT TO BAKEHOUSES,

Framed by the Society of Medical Officers of Health for the Guidance of its Members and Local Authorities under the Factory and Workshop Acts, 1878 and 1883.

THE following suggestions and regulations will probably prove useful to many of our subscribers whose duties include the inspection of bakehouses :—

By sect. 17 of the Factory and Workshop Act, 1883, it is directed that the provisions of sects. 3, 33, 34, and 35 of the Factory and Workshop Act, 1878, shall, as regards retail bakehouses, be enforced by the local authority of the district in which the retail bakehouse is situated, and not by an inspector under the Factory and Workshop Act, 1878 ; and for this purpose the medical officer of health of the local authority is to have and exercise all such powers of entry, inspection, taking legal proceedings, and otherwise, as an inspector under the Factory and Workshop Act, 1878.

Sect. 3 of the Act of 1878 directs that the bakehouse 'shall be kept in a cleanly state, and free from effluvia arising from any drain, privy, or other nuisance ;' that it 'shall not be overcrowded while work is carried on therein ;' and that 'it shall be ventilated so as to render harmless all gases and dust' generated in the course of the manufacturing process. Sects. 33 and 34 require the periodical cleansing of the bakehouse. Sect. 35 requires the proper separation from the bakehouse of any room on the same level used as a sleeping place.

By sect. 15 of the Act of 1883, it is provided, with regard to bakehouses occupied for the first time after June 1, 1883, that 'no water-closet, earth-closet, privy, or ashpit, shall be within or communicate directly with the bakehouse ;' that 'any cistern for supplying water to the bakehouse shall be separate and distinct from any cistern for supplying water to a water-closet ;' and that 'no drain or pipe for carrying off fæcal or sewage matter shall have an opening within the bakehouse.'

By sect. 16 of the same Act it is provided that if any room or place used as a bakehouse is in such a state as to be on sanitary grounds unfit for use or occupation as a bakehouse, the occupier shall be liable on summary conviction to a penalty.

J. NORTHCOTE VINEN, M.D., St. John's, Southwark, S.E.
SHIRLEY F. MURPHY, 158 Camden Road, N.W.
Honorary Secretaries.

REGULATIONS.

1. Every bakehouse shall be kept in a cleanly state, and free from effluvia arising from any drain, privy, water-closet, or other nuisance. The floors shall be carefully swept at least once every twenty-four hours, and the sweepings shall be immediately placed in an impermeable covered receptacle, and removed from the bakehouse at not longer intervals than every seven days.

2. All the inside walls of the rooms of the bakehouse, and all the ceilings or tops of such rooms, and all the passages and staircases of the bakehouse, shall either be painted with oil, or varnished, or limewashed. Where painted with oil or varnished, there shall be three coats of paint or varnish ; and the paint or varnish shall be renewed once at least in every seven years, and shall be washed with hot water and soap once at least in every six months. Where limewashed, the limewashing shall be renewed once at least in every six months. The cleansing should be done in the months of April and October.

3. The troughs and all the utensils used in the making of bread and pastry shall be kept scrupulously clean.

4. A place on the same level with the bakehouse, and forming part of the same building, shall not be used as a sleeping-place :—(*a*) Unless it is effectually separated from the bakehouse by a partition extending from the floor to the ceiling. (*b*) Unless there be an external glazed window of at least nine superficial feet of area, of which at the least 4½ superficial feet are made to open for ventilation.

5. No water-closet, earth-closet, privy, or ash-pit shall be within or communicate directly with the bakehouse.

6. Any cistern for supplying water to the bakehouse shall be separate and distinct from any cistern for supplying water to a water-closet.

7. No drain or pipe for carrying off fæcal or sewage matter shall have an opening within the bakehouse, and every sink-waste, or other pipe used for carrying off surface water within the bakehouse, shall be efficiently trapped and disconnected from any drain.

8. Every bakehouse shall be efficiently lighted, shall be ventilated so as to render harmless all gases and dust, and shall not be overcrowded while work is carried on therein.

9. Every bakehouse shall be used for the purposes of the trade only.

10. No animal shall be kept in the bakehouse on any pretence whatever.

11. No person suffering, or who has recently suffered, from any infectious disease shall be permitted to enter the bakehouse, or take part in the manufacture or sale on the premises, of bread, biscuits, or confectionery.

12. The owner or occupier of a bakehouse shall give immediate notice to the medical officer of health of any case of infectious disease occurring on the same premises as the bakehouse.

PENALTIES.

Every bakehouse in which there is a contravention of sects. 2, 33, and 34 of the Factory and Workshop Act, 1878, which provide for the sanitary condition and cleansing of the bakehouse, shall be deemed not to be kept in conformity with the Act, and the occupier thereof is liable for default to a fine not exceeding ten pounds.

The use of a bakehouse for sleeping purposes, or of a room on the same level as the bakehouse, insufficiently separated from it and insufficiently ventilated and lighted, is punishable under sect. 35 of the same Act by a fine not exceeding twenty shillings for the first offence, and of a sum not exceeding five pounds for every subsequent offence.

An infringement of sect. 15 of the Factory and Workshop Act, 1883, which prohibits—A direct communication between a water-closet, earth-closet, privy, or ashpit, with the bakehouse ; the supply of water to a bakehouse from a cistern also supplying a water-closet ; the opening into a bakehouse of a drain carrying off fæcal or sewage matter, is punishable by a fine not exceeding forty shillings, and a further fine not exceeding five shillings for every day during which the infringement is continued after a conviction.

December 21, 1883.

NOTES AND QUERIES.

Having for some time back been in the receipt of Queries appertaining strictly to sanitary work, and which it would be easy to answer, without having to refer our correspondent to competent professional advisers, we have opened a column in which to register such Queries and Replies thereto as can fairly be expected from us ; and our subscribers and readers are invited to make such use of this column as will tend to benefit themselves and the community. Both Queries and Replies will, however, be subjected, if unnecessarily long, to a strict curtailment.

119. DUTIES OF MEDICAL OFFICERS OF HEALTH AS TO BAKEHOUSES.

I shall be obliged if you will inform me whether the duties imposed by the Factory and Workshops Act, 1883, upon medical officers of health as regards the visiting and inspection of bakehouses, cannot be delegated, when necessary, to the inspector of nuisances. In my district there are a considerable number of bakehouses, and consequently the task is no light one. Does not sect. 102 of the Public Health Act apply, or, failing this, sect. 259 ?

SUBURBAN M.O.H.

[It is very doubtful whether the power conferred by sect. 17 (1) of the Factory and Workshops Act, 1883, can be delegated to an inspector of nuisances. The provision is specific in naming the medical officer of health, and him only, as the person who 'will have, and may exercise, all such power of entry, inspection, taking legal proceedings, and otherwise, as an inspector under the Factory and Workshops Act, 1878.' Had it been intended that such power could be delegated to any other official of the sanitary authority, some saving clause would doubtless have been introduced. As regards the application of sects. 102 and 259 of the Public Health Act, it will probably be found that neither section can be taken as applying in such circumstances.

120. BOARD SCHOOLS.

I should be much obliged if you could inform me in your Notes and Queries whether there is any regulation area (floor space) and cubic space per individual in Board schools, and if there is no rule laid down, what is the usual space allowed ? H.

[The plans of all Board schools built with loans have to be passed by the architect of the Education Department, who states in each case what will be the amount of accommodation provided. This depends to some extent on the shape of the rooms and the kind of fittings—long desks or dual desks ; but, taking one case with another, comes to about 10 square feet of floor space per child.—ED.]

Being engaged in building a house, I have arranged for 9-inch earthenware pipes from my bath-room and w.c., 4-inch pipes from sinks and lavatory-basin, and 6-inch pipes from a two-stalled stable. The house is not a large one, containing only four moderate bedrooms. I should be greatly obliged if you would kindly inform me if my drain pipes are of the proper size.—SANITARY.

[For all purposes, in your case, a 6-inch pipe would suffice for bath and closet and for stable-drains, and even a 6-inch entry into the sewer. The 4-inch pipes are of quite sufficient sectional area for what you propose. You should not neglect the disconnection of the house-drain from the sewer, or the disconnection of the house-drain from the stable-drain.—ED.]

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ORIGINAL PAPERS.

EFFECTS OF THE PRESENT EDUCATIONAL SYSTEM ON THE PHYSICAL CONDITION OF CHILDREN.*

By Dr. RABAGLIATI, M.A.,
Surgeon to the Bradford General Infirmary.

IN attempting to estimate the effects on health of our national system of education, great difficulties arise. I ought perhaps to say, in order to avoid misconstruction, that nothing which I have yet seen stated against that system has altered my conviction that on the whole Mr. Forster's Act was a piece of beneficent and necessary legislation. There can be no doubt that it is good for the children and good for the nation that the former should be trained in orderly and methodical habits, and in the belief that duty is a necessity, and that its performance is an advantage both to those who fulfil it and to the whole people; while a knowledge of the elementary school subjects cannot fail to prove a decided advantage to those who possess it. It is cordially admitted that the physical health of the children has, on the whole, benefited by the operation of the Act, since its tendency has been to remove them from dwellings overcrowded, disorderly, and more or less insanitary, into class-rooms which, if not always so large, airy, and well-lighted as they ought to be, have been at least much better in these respects than the homes from which the children have come. It is exceedingly difficult to make any estimate of the probable or possible effect of the national system of education on health from a study of the returns of the Registrar-General; but the first thing which strikes any one who examines these returns is the immense reduction in the general mortality of the whole community in recent years. Whereas, for instance, the total mortality in the five years 1850-54 was 22·3 per 1,000 of the population, in the three years, 1878-79-80, it averaged only 20·9 per 1,000, which gives an improvement in the total mortality of over 6 per cent. When this result is further examined it appears that practically the whole of the reduction has been effected by the enormous diminution which has taken place in the mortality from zymotic diseases, or fevers. Whereas the mortality from fevers in the five years 1850–54 was 5·234 per 1,000, it had fallen in the three years 1878-79-80 to 3·864 per 1,000. This reduction, which amounts to about 25 per cent., is, no doubt, due to the enormous strides made of late years in this country in the improvement of sanitary conditions—improvements which, although effected at a very great outlay, have been well worth the cost; and the results of which, it may be said without exaggeration, have been unparalleled in human history. Now there can be no doubt (for my own part, at least, I have no doubt) that, on the whole, the Elementary Education Act has not only not acted in a contrary direction to the causes resulting in this immense sanitary gain, but has actually contributed to it. How much it has contributed it is impossible to say, but it is enough to feel satisfied that the tendency of the Act is, on the whole, in the right direction.

But a further question remains. Granted that the tendency of the Act on public health has been on the whole good, we may ask, first, has it been good to all the extent it might have been? and, second, has it had any results of a hurtful nature? I am decidedly of opinion, first, that the public health has not been so much benefited by the Act as it might have been; and, second, that some of its effects have been prejudicial to health. I propose to give the evidence for these two opinions here, and to deal with the last question first. It seems to me that evidence overwhelmingly conclusive exists to show that children have been over-driven by the working of the Elementary Education Act. Medical men, teachers, and parents have all testified to this, and it seems quite impossible to overlook the importance of the evidence they have advanced. As regards the medical evidence, when the names of such men as Dr. Clifford Allbutt, Dr. B. W. Richardson, Mr. Pridgin Teale, Dr. Crichton Browne, Dr. Carpenter, and others, are mentioned as having expressed themselves more or less strongly in this sense, one feels how important is the weight of opinion arrayed in support of the view. Dr. Richardson speaks of the overwork in schools as a 'temporary insanity.' Dr. Crichton Browne 'can conceive of no surer way of depriving our artisans of the next generation of their manual dexterity than to insist on sedentary habits in the boys of to-day, keeping them with books in their hands during those years when the hand centres are evolving;' and speaks of its being 'high time for a declaration of rights on behalf of helpless children, and on behalf of future generations also, whom, if we are not careful, we shall load with a burden more grievous than the National debt—a burden of degeneration and disease.' Dr. Clifford Allbutt says he 'has in the course of his professional career, conversed with large numbers of medical men, but that all those with whom he has conversed have had an opinion in one way.' But if this testimony, though important, be pronounced to be more or less vague and general, and too indefinite to justify us in asking for any important modifications in the working of the Education Act, specific cases of alleged overpressure are abundant and can easily be quoted. If it be thought unfair to refer to the one or two cases of suicide which have occurred in connection with Board school work, as being too exceptional to prove anything, other cases can be detailed. I have asked several of my medical friends for details of cases. Some of them have said they have had experience, more or less extensive, of cases of disease due to the overwork of elementary schools. When I have asked for particulars, some have excused themselves on the ground that, being busy practitioners, they could not find time to take notes of the cases when they occurred, and therefore could not give details with such accuracy as was necessary for publication. Still they felt justified in forming the opinion that the school work was often too hard for the children. Other medical men have given me cases, a selection from which I insert here. There seems reason to believe that epilepsy in a milder or more severe form has occasionally been induced by overwork at school, and by evening preparation of work for next day. The following two cases, communicated to me by Dr. Dobie, of Keighley, have recently occurred in his practice. One boy was eight years old when he came under Dr. Dobie's care for the *petit mal* of epilepsy. The child was delicate, having suffered from whooping-cough and bronchitis at two years of age, and from severe inflammation of one lung at five. He went to a Board school between

* Abridged from a paper read on April 16 at the Annual Conference of the National Union of Elementary Teachers held at Leicester.

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five and six, had five-and-a-half hours at school, and often more for examinations, and an hour or an hour-and-a-half in the evening of home lessons. The child became nervous, sleepless, frequently starting at night and saying, 'Don't cane me.' This was followed by slight epileptic fits, now in process of improvement since his withdrawal from school. The family history in this case is good; and no other case of nervous disease is known in the family. The other case is that of a girl aged nine attending the same Board school. There was no history in this case either, of hereditary weakness, nor had the child ever required medical advice before. She had been in good health till about a month before she was seen by the doctor; but during this time she had complained of her lessons—particularly arithmetic—causing her head to ache, and would burst out crying at times. After this, epileptic fits set in and the doctor recommended her withdrawal from school for 6 months. It will no doubt be said that this child ought to have been withdrawn earlier; but to show the difficulties which sometimes attend the withdrawal of a child from school, I give the following case:—A boy of nine sustained a severe head injury, and came under the care of a hospital surgeon as an in-patient. After being in the hospital for several weeks he was sent out to all appearance well; but, after his return to school, it was observed that he was not the bright, clever boy he used to be, and that in particular the arithmetic, which he formerly liked, was very troublesome to him. The schoolmaster noticed this, and wrote a letter stating that he did 'not consider the boy able to bear the strain of school.' The father then sent the boy to distribute newspapers, when he was summoned before the school committee for not sending the boy to school. Although he produced the schoolmaster's letter he was ordered to send the boy to school whole days. This he refused to do, whereupon he was summoned before the magistrates. He then brought the boy to the surgeon who had attended him in hospital. He wrote a certificate setting forth the fact of the accident and its consequences, and stating his opinion that the boy ought not to go to school for more than half days. Although I am credibly informed that both this certificate and the schoolmaster's letter were handed in to the bench, the father was fined half-a-crown, and ordered to send his son to school forthwith. I am told that the father means to resist the order. Dr. Goyder, of Bradford, details to me another case of epileptic fits, brought on by working up for examinations, in a boy of thirteen. He also describes to me a case of chorea, with recurring attacks of great severity, due, in his opinion, to over-pushing at a Board school. This child, a girl of ten years, is now kept from school altogether, and taught at home. I could quote other cases, both in my own experience and in that of other medical men whom I could name, did the limits of this paper permit me to burden it with such details. The facts I have given refer to cases of serious illness, but there is a general concurrence of medical testimony as to the occurrence of cases of slight ailments, scarcely to be called disease, which are unhesitatingly attributed to the over-work of elementary schools. Parents, also, who are quite competent to judge in the matter, tell of sleeplessness, nervousness, startings at night, sleep-walking, pallor, loss of appetite, &c., from which the children suffer, and which the parents rightly attribute to educational over-pressure. I consider that the prevalence of one or more of these lesser symptoms among a large number of children is of more consequence to the national health than the occurrence of a few cases of severe illness, or even than a death or two. It is the widespread incidence of small illnesses or disabilities acting on a large number of children, which is likely to have a bad effect on the national health rather than the occurrence of graver ailments among a few. For one thing, grave ailments are sooner seen, and parents do not feel as if they were making a fuss in drawing attention to them or in calling in medical advice, whereas the smaller ailments are allowed often to pass unnoticed, or (which comes to the same thing), if noticed, to have nothing done for them. No doubt any causes which interfere with the health, vitality, and happiness of children, with what has well been termed the 'full current of life,' ought to receive serious consideration from those who have at heart the maintenance of the national life.

The question, of course, is to what extent do these deteriorations of health exist? Are they widespread? or are they such as must be expected to happen occasionally, whatever the system adopted? For my own part, it seems to me that evidence concerning overpressure justifies the opinion that it exists to a very considerable extent, and that the worst phases of it are the small ailments and little worries to which I have referred. As to the mortality among children, there has been much discussion. The Education Department has shown that while there has been a decrease of nearly 20 per cent. in the mortality of children at school age in the decade 1871–80 as compared with 1861–70, the mortality from brain diseases has been stationary, or has shown an increase which can only be determined by using a second place of decimals. This evidence is good, so far as it goes, though it still remains to be explained why brain diseases alone have shown no decrease while the mortality from all causes has been diminishing. This raises a difficult question. I think myself that the Board school education has had some share in the causation of this unpleasant fact, but I do not think it has been the whole of the cause. The reasons which lead me to think that the working of the Elementary Education Act has had some share in the causation of the non-diminution of the mortality from brain diseases of children of school age are these. First of all, these are the ages, five to fifteen, years at which any effect of education (if it exist at all) would be likely to be observed. Next, nervous affections are those in which we should mainly expect to observe a rise if the educational pressure is severe. In the next place the time during which the relative rise of mortality (for a non-diminution when the mortality from all other causes has fallen *is* a relative rise) has been observed is the very period during which the Board school education has acted on the national life. These three reasons are general, and it seems to me, in the absence of figures, they at least raise a *primâ facie* case for the inquiry, Has the working of the Act been the cause, or a main part of the cause, of the phenomenon observed? But in addition to these considerations the figures themselves, so far as I have been able to examine them, seem to me to go towards justifying the suspicion formed on the general grounds above detailed. I have made a comparison between the mortality of children in the three years, 1868, 1869,

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and 1870, and that of children of the same ages in the three years 1879, 1880, 1881. The former refers to the period before the Act began to operate, and the latter to a time when it had been some years at work. In order to be able to come to a conclusion, I have split up the mortality under fifteen years of age into the two groups of (1) those occurring under five years (before school age), and (2) those occurring from five to fifteen years (school ages roughly). I have then calculated the ratio which the mortality at one set of ages bears to that occurring at the other. By comparing the ratio for the three years 1868, 1869, and 1870, with that for 1879, 1880, and 1881, a result has been obtained which confirms the suspicion come to on general grounds.

Mortality of Children from Nervous Diseases.

	1868.	1869.	1870.	Total.	Ratio.
Under Five Years	29,043	29,267	30,006	88,316	12·5 : 1
Five to Fifteen Years..	2,246	2,235	2,485	7,016	
	1879.	1880.	1881.	Total.	Ratio.
Under Five Years	29,399	29,970	28,337	87,706	10·7 : 1
Five to Fifteen Years..	2,663	2,773	2,733	8,174	

That is to say, while in 1868, 1869, and 1870, there died of nervous diseases twelve and a half times as many children under five years of age as between five and fifteen, in the three years ending 1881 there died only 10·7 times as many under five as between five and fifteen years. In other words, if we take 535 deaths of children under fifteen years of age in the two periods and compare them, we shall find that in the three years ending 1870 forty-three of them were between five and fifteen years of age, but in the three years ending 1881 fifty were between these ages. The ratio of deaths at school ages is about one-sixth greater in the later period than in the earlier. I ought to say that in calculating this result I have taken no account of the mortality from convulsions, because that is a disease almost entirely confined to infancy, and because, therefore, it can have no bearing on the death-rate from five to fifteen years.

This result is the more remarkable when compared with the alterations of the rates of mortality among children at the same ages for the same years from diseases other than nervous. The chief causes of death in childhood, besides nervous diseases, are, 1, fevers; 2, constitutional diseases; 3, respiratory; and 4, digestive. A large number of deaths in childhood are also caused by developmental diseases, but as hardly any of these deaths occur between five and fifteen years of age, I have left them also out in my calculation. Now the curious fact is that whereas, as we have seen, the proportion of children from five to fifteen who die from nervous diseases has increased since the enforcement of the Education Act, in the case of deaths from 'other causes' a contrary result is found. I will not here deal with the figures in detail, but will point out the broad result. In 1868–70, for every death which occurred in children between five and fifteen years of age from the causes named, 5·2 deaths occurred under five years of age; but in the three years ending 1881, for every death between five and fifteen years of age from these causes, 6·2 deaths occurred under five years. That is to say, while the mortality of children between five and fifteen years of age from non-nervous diseases has *decreased* by about one-fifth as compared with that of children under five years, the mortality from nervous diseases among children of school age has proportionally *increased* by about one-sixth in the same period. These results are remarkable, and, taken in connection with the general considerations already advanced, seem to me to justify the conclusion that the working of the Education Act is a main part of the cause of the proportional increase of the mortality from nervous diseases at school age. The inference appears to be plain, that sanitation is in course of reducing the mortality among young lives, but that the working of the Education Act has to some extent counteracted this.

This, however, is not the whole case. Apart altogether from any effects which may be exerted by the working of the Education Act, there are other causes in existence which might reasonably be expected to increase the general mortality from nervous and other diseases, due to pressure. The life of to-day, it may be argued, is not lived in the quiet, even, regular way to which our forefathers were accustomed, before the days of telegraphs, rapid railway travelling, and daily or hourly posts. The increased competition of life, its increasing complexity, the haste that characterises it, and the revolution that has accompanied the introduction of steam machinery, all might have been expected to increase the nervousness of the race. Therefore it is rather curious that up to the present the Registrar-General's returns do not show so large an increase of mortality from nervous diseases in the whole people as we might have expected. In the five years, 1850–54, the death-rate from nervous diseases was 2·777 per 1,000 of the population, while in 1877–9-9 it was 2·797, a very inconsiderable increase. Thus the broad result, as regards nervous diseases, is that a very inconsiderable increase is apparent in the general mortality due to them. One argument, however, may be advanced which rather contradicts the expectation that might have been entertained about the increased nervousness of the times. Nervous parents it might have been expected would have nervous children, and therefore infant mortality from nervous diseases might have been expected to rise. But the odd thing is that the contrary is the case, and that the mortality of children under five years of age from nervous diseases is less than it was, as compared with that from five to fifteen years of age, instead of the opposite, as might have been anticipated. These considerations, however, by no means exhaust the subject, and I must content myself by stating the probability that not all the proportional increase of the mortality from nervous diseases of children of school age is due to the working of the Elementary Education Act; and that, on the other hand, the Act has probably been a main part of the cause of the proportional increase in question. Even if, however, any should be found to contend that the working of the Act is less to blame than I suppose, the argument, it seems to me, is little less strong for caution in its administration than it was before. For if not the Act, then some other causes must account for the slight increase in the mortality among children under fifteen years of age from brain diseases, and to these causes must also be due the relative increase of mortality among children of school age as compared with those under the age of five years. In either case, the only legitimate rule we can take to guide our conduct is

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to pay the greatest attention that our administration of the Act be not used as a lever for raising causes of mortality, which it is on all hands agreed ought to be reduced as much as possible. At least, it is fair to ask that such modifications be made in its working as will prevent complaints that cases of short-sightedness, epilepsy, chronic meningitis, besides a crowd of smaller ailments, are directly attributed to it by medical men.

It is evident I hope, from what has already been said, that this question is a very large one. I do not pretend to have dealt with it exhaustively, but have thought it right to confine my remarks to some of the medical considerations which underlie it. The question of remedies I must leave to be comprehensively treated by others, only suggesting that the system of payment by results appears to be, by almost universal consent, at the bottom of all the mischief. Whoever deals with the question of remedies must give special attention to the number of hours during which young children ought to be expected to work. If five hours' work is not too much for children under ten, at least 'keeping in' should be illegal, and an hour or an hour and a half of school time ought to be devoted to breaking ground in the new lessons for next day. Home lessons ought not to be required of children under that age. Some of the best teachers find it quite possible to get on without them. I have been told of one who has passed 93 per cent. of his pupils without any home lessons at all. No brain work should be done by children so young during the two hours immediately before bedtime. I do not mean that they should be idle. Children playing games in summer, and in winter performing little domestic duties which exercise their hands and limbs, should not be considered as idling. Such exercises induce the healthy fatigue which promotes that healthy sleep by which body and mind are refreshed and prepared for the work of a new day. Do not let us forget that in young children mind and body are developing simultaneously, and that the one cannot grow healthily if the other is neglected. I think, therefore, that it would be a great advantage if one hour of the school time every day were devoted to such exercises as drilling, marching, and dancing, or to some of the active kindergarten games intelligently directed. In the case of children over ten years of age, some mechanical or technical instruction might take the place of marching, drilling, &c. Another half an hour every day might very well be devoted to singing. This proposal would give us three hours for teaching proper for children under ten, one hour for exercises, one for the preparation of new lessons, and half an hour for singing. Under some such varied plan as this, I believe, many of the children who are now classified as 'dull' would cease to be so; but liberty should still be granted to school managers to withdraw from examination dull or delicate children up to 10 per cent. of the whole number without loss of grant.

It is of the utmost importance that we require of young children only such tasks as they can perform well, and that we then insist that these be thoroughly done. To set them tasks beyond their strength, or to attempt to compel attention when their limited power of attention is exhausted, can only result in inducing habits of working in a slovenly and careless manner, and must inevitably tend to increase the number of men and women, already so large, who live to 'scamp' their work, rather than to do their duty.

THE FALLACIES OF EMPIRICAL STANDARDS IN WATER ANALYSIS AS TOLD BY THE STORY OF A POLLUTED WELL.*

By ALFRED ASHBY.

Medical Officer of Health and Public Analyst for Grantham, &c.

SOME months ago I had occasion to analyse some water from a well sunk in the variegated marl of the Trias, and found, in 100,000 parts, chlorine 7·0, nitric acid (N_2O_5) 5·0, sulphuric acid (SO_3) 5·2, phosphoric acid very heavy traces. Total solids 51·0, free ammonia ·0009, albuminoid ammonia ·0055. If I had judged the water by Mr. Wanklyn's standards it would almost have come under his class 1, 'water of extraordinary organic purity.' But it only just overstepped the bounds and would have entered his class 2, which he says are waters 'safe organically.'

However, I neglected these empirical standards, and judging it by the ordinary accompaniment of sewage it contained I pronounced it impure.

The owner then had the well, which supplies a house in a village, remote from other premises, opened and examined. On examination, the lining was found to be of dry laid bricks and to be very defective. The well is 3 feet 6 inches in diameter and 35 feet deep. It is sunk first through a bed of clean, red gravel, of which I produce a sample. The brick lining is 17 feet deep and extends into the hard red marl which continues to the bottom of the well. There were 13 feet of water in it. Top water from the gravel bed continually drops through the lower part of the lining, but the main supply flows in rapidly at the bottom through the lower 7 feet of the red marl. Near the bottom of the lining on the north side was a black patch in the defective brickwork, about 2 feet square. From behind the bricks, at that spot, the black discoloured gravel which I now produce was taken.

Thirty feet from the black patch in the lining was a cemented cesspool, into which the drain from a water-closet emptied. It appeared for the most part to have been well made, but there was a leak at the junction with the outlet pipe, through which sewage had plainly percolated. The cesspool had been nearly emptied before I commenced my examination.

The drain from the soil-pipe passed within six feet of the well on its way to the cesspool. Eleven feet from the west side of the well there was a common privy with a large vault, which had not been emptied since it was made about six years ago. The contents were abominably offensive. The back of the vault was 17 feet from the well, and at that part it was evident that its filth had been soaking into the gravel. There was also a small cesspool for the kitchen sink two feet from the well, and the drain from it passed close to the latter. I determined the chlorine on the spot in the water taken from the drippings through the well lining at the black patch opposite the cesspool, from the west side opposite the privy, from the south side and from the east side. The quantities per 100,000 parts were as follows: West side, 8·4; black patch, 6·4; east side, 5·76; south side, 5·4. On the previous day the water from the black patch had 7·0 chlorine in 100,000, which shows it was of variable constitution.

* Read before the Society of Medical Officers of Health, April 18.

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The gravel water would naturally have the same composition all round the well, so the chlorine may fairly be considered to have indicated the relative degrees of impurity of the surface water that was dripping in at the several spots indicated.

It was clear, then, that at the time I examined the well the greatest pollution was taking place on the west side opposite the privy vault, next at the black patch, opposite the cesspool, which had been just previously emptied; then on the east side, and lastly on the south side.

To place it beyond dispute that the privy vault had leaked and had allowed impurities to soak into the well, I had a large quantity of rock-salt put into it and had it filled with water. About twenty-eight hours afterwards a sample of the drippings from the well-lining on the west side showed an increase in chlorine from 8·4 to 11·3, or about 3 in 100,000 parts. There can be no doubt, therefore, that there had been a free passage for filth from the privy to gain admission into the well.

The analysis of this water, taken before the salt had been put into the privy, gave the following results in 100,000 parts:—chlorine 8·2, nitric acid 5·7, sulphuric acid 8·6, phosphoric acid v.h.t., total solids 56·0, free amm. ·0323, alb. amm. ·0282.

The composition of water collected from the black patch was:—chlorine 6·6, nitric acid 19·4, sulphuric acid 6·8, phosphoric acid v.h.t., total solids 72·6, free amm. ·0018, alb. amm. ·0167 per 100,000 parts.

The well was then pumped empty, when I descended, and took a sample of water as it issued from the red marl, about two feet from the bottom. For the purpose of excluding the possibility of any admixture of the top water which was continually dripping down the sides of the well, I inserted a piece of pipe about nine inches into the marl, and plugged it in with clay. I was in that way able to collect from the free end of the pipe a sample of water exactly as it flowed from the marl; and found on analysis that it contained per 100,000 parts — chlorine 6·1, nitric acid 7·5, sulphuric acid 3·2, phosphoric acid v.h.t., total solids 52·4, free amm. ·0016, alb. amm. ·0079. It had a temperature of 49° F.

These results were somewhat inferior to those I had obtained when I first analysed the well water. I think this may be accounted for thus:—About fifty yards from the side of the well the bottom sample was collected from, there is another well sunk into the same geological formation. It is by some stables which are drained into a cesspool; the drain passed close by it, and had become completely blocked up. In close vicinity also are a common privy and a large manure heap on which pigs dwell. Its water yielded on analysis per 100,000 parts chlorine 5·9, nitric acid 17·6, sulphuric acid 10·8, phosphoric acid v.h.t., total solids 108·1, free amm. ·0007, alb. amm. ·0113. The house well having been pumped dry, there was a strong inflow from the marl, so much so that the pump had to be worked pretty constantly to keep it down. Some of the impure stable well water would thus be drawn into it mixed with the purer water in the intervening length of marl.

In order to ascertain, if possible, the natural composition of the water from that particular stratum I analysed some from a well about a hundred yards off; it being placed by a house which stands by itself in large grounds. This water contained in 100,000 parts, chlorine 1·6, nitric acid 4·6, sulphuric acid 3·3, phosphoric acid v.h.t., total solids 31·9, free amm. ·0013, alb. amm. ·0188. Another well near to this on the same premises yielded chlorine 3·0, nitric acid 5·5, sulphuric acid 3·5, phosphoric acid v.h.t., total solids 37·6, free amm. ·0016, alb. amm. ·0133 per 100,000 parts.

The water named last but one, although not above suspicion as to its purity, may be taken as showing the composition of the best well water that can be obtained in that neighbourhood, and it will be observed that though its organic matter is higher than in the well water so often referred to in this paper, nevertheless the usual sewage accompaniments in it are less.

These analyses and facts have plainly established the assertion that some of the water that was flowing into the well under consideration was highly polluted, and that the water taken from it was capable, as occasion arose, of conveying the specific infective matter of filth-disease to any person partaking of it, empirical standards notwithstanding.

No. 15 on the accompanying table is the analysis of a water from the chalk formation, and No. 16 of one from the marlstone rock bed of the Middle Trias. The analyses Nos. 8 to 14 represent well waters taken from a town, about two miles from the well I have described, situated on precisely the same geological formation, where the wells vary in depth from 7 or 8 to 20 or 25 feet, few being so deep as 20 feet. The nitric acid and other sewage accompaniments are unusually high, yet the free ammonia in all of them is low, and the albuminoid ammonia in all of them, except Nos. 14 and 16, would permit of their being placed in Mr. Wanklyn's second class, which, he says, are waters 'safe organically.' The two exceptions would come just within his third class, and would be styled 'dirty waters.'

But in all these instances the contamination of the waters had its origin at very short distances from the wells themselves, many of them having been specially examined because they were plainly the medium by which typhoid fever had been spread. To prove this assertion I give the distances of sources of pollution from the wells, as follows: No. 8, ash-pit and water-closet drain close; drain 10 feet. No. 9, open channel from urinal passes over the top of the well; w.c. drain close; privy, 11 feet. No. 10, gully and drain, 3 feet; privies, 60 feet. No. 11, uneven surface channel drain close; privy vault, 31 feet. No. 12, grate and drain, 3 feet; w.c. drain, 15 feet; large midden and urinal, 47 feet. No. 13, scullery drain, 3 feet; uncovered ash-pit, 10 feet 6 inches; privy, 14 feet; w.c. drain, 24 feet. No. 14, gully and drain, 20 feet; enormous privy vault unemptied for three years, 25 feet. No. 15, well 90 feet deep in chalk; privy, 20 feet; cesspool, 45 feet; old cesspool, 30 feet. No. 16, slop holes, 6 feet; privy and leaking sewer near.

In the locality from which the series of waters No. 8 to 14 were taken, I have not often found any with very large quantities of free ammonia; and in many wells, under almost identically the same conditions with respect to the liability to pollution, I have many times found waters with high nitrates, but in which much less oxidation of the organic matter has taken place.

In newly-made wells situated in more recently inhabited parts, the oxidation is often less complete, the polluting organic matter being less changed into nitrates; but when the ground has been well saturated with sewage matters, and has become converted into

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a nitre bed, as it were, which property the variegated red marl of the Trias appears readily to assume, then the oxidation is carried much further. Yet surely it cannot with any reason be urged that water which has passed through this sewage-befouled soil is likely to be the less dangerous on that account, notwithstanding that much of the organic nitrogen may appear as nitric acid instead of in its original form.

In the series of analyses alluded to, the nitric nitrogen amounts on the average to 8·28 in 100,000, whilst the albuminoid ammonia nitrogen—which, by the way, does not represent the whole or even a constant proportion of the organic nitrogen left in the water—amounts to only ·0075 in 100,000. So 1,100 parts of the original organic nitrogen were oxidised and only one left, which shows that this residue is of a different and far more permanent character than the bulk; and in all probability this remainder of organic matter, however small it may be, representing as it does in all likelihood the organised and more resisting living part of the polluting matter, may be a most potent agent as a disease carrier. Therefore it matters not whether it appears in the analytical results as 0·1 or 0·0001, or any less quantity per 100,000; and it would appear more probable that greater danger lurks in this more stable organic matter than in the more readily oxidisable part.

Greater significance must therefore attach to minute quantities of organic matter when accompanied by any excess of the usual sewage accessories—chlorine, nitric, phosphoric, and sulphuric acids—over and above the normal standards belonging to the natural unpolluted water of the geological formation from which the samples under examination may have been taken, than when the substances mentioned are normal in amount. In other words, it is safer to judge the quality of a water by the mineral constituents enumerated than by the organic indications, readily changeable as they are.

Some time ago I ascertained the weight of a dried Daphnia pulex, which I had taken out of a sample of water. I found it to be three-tenths of a milligramme, or not quite one two-hundredth of a grain. On distilling it with alkaline permanganate it yielded ·0000025 grammes of ammonia, which would have been represented in an ordinary water analysis as ·000, albuminoid ammonia in 100,000 parts, because the quantity of ammonia it yielded would have been doubled, as only half a litre is usually taken for a distillation.

Each yeast-cell has but a weight of about one-ten millionth of a grain, yet these are the giants amongst the organisms with which we have to deal in reference to disease production.

But I shall err on the right side if I assume that a disease germ could weigh as much as a cell of the yeast plant. It would take 50,000 of these even to make up the weight of the Daphnia, and to yield the insignificant quantity of ·0005 part of albuminoid ammonia per 100,000. But if half a pint of water yielding that small quantity of albuminoid ammonia were drunk, about 2,200 yeast-cells might have been swallowed, and, in all likelihood, very many times that number of disease organisms, and we know not how few of them will suffice to convey disease, yet forsooth an empirical chemical standard, based upon the organic indication in the water, would declare it to be absolutely safe and free from danger!

I have known arsenic in quantities poisonous to beasts to traverse fifty yards into a well. Again, I have known carbolic acid to pass from a privy vault into a well fifty yards away, so as to make the water undrinkable; and I cannot doubt that these infinitely small bodies would be capable of being conveyed at least as far, and as they probably resist oxidation to a far greater extent than putrescible effete animal matter, being in fact the agents by which those substances are nitrified, much of the accompanying filth would be found in the water as nitric acid, whilst they themselves would furnish on analysis an amount of organic carbon and nitrogen, or of albuminoid ammonia, which, may be, would be represented in the third or fourth place of decimals, yet surely, since they are the morbific agents, the danger is none the less if those figures be small.

The infected dejections from even a single individual have been proved by Mr. Jacob and Dr. Thorne Thorne to have spread typhoid fever far and wide through the Caterham water supply. How much greater danger, therefore, must there be from the continual soakage of even very small quantities of sewage impurities into the limited and confined water in a house well.

Experiments made with the analysis of water containing portions of only solid excreta, do not correspond with the circumstances actually met with in practice, for there we have all the other constituents of sewage to help us in forming an opinion. If tricks have been played with a sample, surely analysis must not be blamed if correct results are not attained. But if we look at Dr. Dupré's analyses made for Dr. Cory's report on samples of water, purposely polluted with excrement, &c., contained in the medical officer's report in the supplement of the eleventh annual report of the Local Government Board, it will at once be seen that the amount of phosphoric acid—the importance of observing which was, I think, first insisted upon by Mr. Hehner—is a sure indicator of the presence of excretal matters, and is more uniformly reliable, as such, than the attempted estimation of organic matter; and I think that these results show that we should not presume to give any absolute opinion of the relative amounts of pollution in any water on the data obtained in trying to estimate the organic matter, and consequently that it is unscientific to attempt to classify waters on such determinations alone.

The fact is that such standards, simple as they have hitherto been, have been a mistake, a miserable makeshift, to bring us over a difficulty due to our ignorance. There are no unvarying standards in nature, least of all in the case of water; every brooklet, and the water from each geological formation having a composition peculiar to itself.

To judge a water with any approach to infallibility, we must first know all about its derivation, and then we no longer want a standard, whereas the empirical standards which have been proposed are just adapted to let us dispense with the specific information respecting each sample. In fact, they would lead the unthinking or the uninitiated to believe that we are able to accomplish what is to us an impossibility. Our only standard, as insisted upon by Dr. Dupré and Mr. Hehner in a paper read before the Society of Public Analysts, must be the natural water of the locality and of the geological formation from which each sample is drawn; then the *slightest deviation* from this will be a sure indi-

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cation of the degree of pollution any water may have undergone. Any fixed standard must be completely futile until nature shall be so obliging as to consent, in deference to its requirements, to acknowledge she has been wrong, and to renounce her usages of countless ages in its favour, so as to conform to what it says should be the case by making all her varied waters of exactly one and the same description. With very badly polluted waters it cannot be argued that there is any need for a standard ; they simply exceed everything known in nature, they are natural impossibilities, artificial compounds produced by the filthiness or carelessness of man, and will at once be stamped as such by analysis, without the extraneous aid of an unnatural standard. Let us review the consequences of water standards which have been proposed. Have they not led to diametrically opposite opinions being passed on one and the same water by different chemists? So true is this that some of the medical inspectors of the Local Government Board have repeatedly told me that they have no faith in water analysis ; in fact, one of them has said to me that for years past he has not had any waters analysed during the conduct of inquiries he has had occasion to make into the sanitary condition of, or causes of disease in, any district.

What has Dr. Buchanan, the medical officer of the Local Government Board, to say on the subject? On page 9 of his report in the supplement to the tenth annual report of that board he writes in the following terms :—' Some very interesting examinations of the significance to be attached to the current methods of chemical analysis of potable waters have been made during the year. Samples of water were purposely polluted with one and another material, but especially with the stools of enteric fever patients, and were then submitted to examination by the chemist. Dr. Cory, to whom the inquiry has been entrusted, is not yet in a position to report on the whole results of it ; but he has already learned enough to show that these examinations were greatly needed, in correction of judgments commonly pronounced about the wholesomeness and unwholesomeness of samples of water that have been the subject of analysis.'

What is the result of adopting any empirical standard whatever? Does it not increase this discreditable muddle? I contend that it does in an extreme degree, and renders confusion worse confounded. I argue that any limited standard fails to do what it proposes. It tells us actually nothing about the presence or absence of pollution. In the face of the discrepancies due to the adoption of standards, what marvel can there be that the utterances of water analysts are received with incredulity and distrust?

Then, again, if it were possible to devise any standard which would give reliable results in all cases—and I do not admit that it is—surely no constituent of the water could have a fixed value under all circumstances. For instance, it cannot be correct to give a certain amount of chlorine the same value when, say, the free and albuminoid ammonia and sulphates and phosphates, &c., are high, when it would almost for a certainty be derived from sewage, and be foreign to the water, as it has when these bodies are almost entirely absent, in which case its presence would very likely be owing to the water having been drawn from near a salt bed or the sea, and would be entirely natural to it, indicating no danger whatever.

And again, a given permanent hardness cannot have the same meaning in a selenitic water as in one which is naturally devoid of much permanent hardness, but in which it has been raised by sewage pollution. Neither can the high free ammonia of a deep Artesian well water, which ought to count for nothing at all, or the high albuminoid ammonia of a peaty water have the same significance, or point to the same danger, as similar amounts derived from the infiltration of the contents of a privy cesspit into a shallow well ; and so on for all the other items of the analysis.

No item can possibly have one fixed value under all the varying circumstances which attach to water supply, albeit a fanciful standard handicaps all waters alike in respect of them. With water analysis it is not a question of quantity in sewage pollution. We cannot say that such or such a quantity of polluting material is dangerous, but that a half or a third of the same quantity is innocuous. The fact being that if a water exhibits the usual accompaniments of sewage, however small or large the indication of organic matter may be, it must be considered dangerous and unfit for use for dietetic purposes until we become acquainted with the natural conditions by which infective material can be rendered inert and harmless. The method of determining organic matter, whether chemical or biological, whether by the combustion, distillation, or oxygen process, is a matter of little moment. They are all more or less qualitative tests, and tell very much the same tale. It is to the wretched wrangling, during the ten years past, over these rival processes, and to the ridiculously exaggerated importance that has attached to them, is due, in a large degree, the discredit into which water analysis has fallen amongst engineers and sanitarians. The facts which I have given in this paper should prevent any analyst from, as is often the case, fearlessly pronouncing a confident expression of opinion as to the perfect safety of a water, more than likely of unknown origin. If there is much indication of organic matter it often lends an additional reason for condemning a water, but the absence of it, *per se*, should not induce an analyst to report favourably on a sample. I am perfectly convinced that analysis of water may furnish valuable *positive*, but not *negative*, evidence as to pollution.

Analyses of Water referred to. *Parts per* 100,000.

No.	Chlorine.	Nitric Acid (N_2O_5).	Sulphuric Acid (SO_3).	Phosphoric Acid.	Total Solids.	Free Ammonia.	Albuminoid Ammonia.
1	7·0	5·0	5·2	v.h.t.	51·0	·0009	·0055
2	8·2	5·7	8·6	v.h.t.	56·0	·0324	·0282
3	6·6	19·4	6·8	v.h.t.	72·6	·0018	·0167
4	6·1	7·5	3·2	v.h.t.	52·4	·0016	·0079
5	5·9	17·6	10·8	v.h.t.	108·1	·0007	·0113
6	1·6	4·6	3·3	v.h.t.	31·9	·0013	·0188
7	3·0	5·5	3·5	v.h.t.	37·6	·0016	·0133
8	8·1	14·8	—	t.	93·6	·0024	·0098
9	19·0	43·9	—	h.t.	191·2	·0017	·0 97
10	6·6	13·7	—	h.t.	94·2	·0025	·0058
11	11·2	22·5	—	h.t.	141·0	·0012	·0074
12	14·6	24·4	—	v.h.t.	161 5	·0024	·0098
13	12·6	27·2	—	v.h.t.	160·5	·0021	·0084
14	29·6	77·1	—	v.h.t.	275·7	·0019	·0137
15	5·2	11·6	—	h.t.	69·1	·0047	·0057
16	7·3	17 2	—	v.h.t.	90·2	·0014	·0103

t = trace ; h.t. = heavy traces ; v.h.t. = very heavy traces.

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OUTBREAK OF SMALLPOX AT THE EAST END OF LONDON.*

By JOHN W. TRIPE, M.D., M.R.C.P.Ed.

Medical Officer of Health for Hackney.

AT the request of the President I now lay before you a brief account of this outbreak, which as far as Hackney was concerned is somewhat remarkable. During the latter half of last year there has been an unusual persistence of small-pox in the vicinity of the hospital as compared with the other parts of the district, although the disease was by no means confined to this locality. I attributed this in some measure to the drainage works that were then being carried out at the hospital, as a rather large number of workpeople were employed within the grounds, so that there was an unusual amount of communication between those engaged in the grounds and the inhabitants outside. There can be no doubt that the men engaged were at times brought into close contact with inmates of the hospital, as I saw them (the workmen) engaged at work in the recreation ground, and the patients taking an airing in the same place without any line of separation between them. I do not mean to say that they were close together when I saw them, but they might have been at other times. Since the works have been finished the disease continued prevalent within half a mile of the hospital. The first decided notice of an impending epidemic was given by the occurrence of fifteen cases on February 22, of which four cases were treated at home and eleven were removed to the hospital. These cases occurred in nine houses and no less than five were moved from one house on the 23rd, having been infected from a previous case in the same house. On March 2 a case occurred in the Upton House Reformatory School, in the person of a lad who had been in the house for two months. This school is just on the verge of the quarter-mile radius from the centre of the hospital, and as many as three cases have occurred on separate occasions in this school. One other isolated case occurred on March 14 in a female refuge, and a second in the person of a young woman who had left there to go to a situation several miles away on March 2. Neither of these persons had been outside the building for more than a month. I mention these to show not only the difficulty of ascertaining how the disease was contracted, but also that there was some probability of aerial infection. This refuge is in Dalston Lane, considerably more than half a mile from the hospital, and is situated in its own grounds at some distance from the road.

Four cases (I use 'cases' as signifying one case only in a house, and therefore four cases represent four houses), occurred within the quarter-mile radius, one within the half-mile, two within the mile, and only two outside. On the second day of the outbreak one occurred within the quarter-mile radius, five between the quarter- and half-mile radii, two in the space between the half-mile and mile radii, and three outside. On the third and fourth days of the outbreak there were four in the quarter-mile radius, five in the space between the quarter- and half-mile radii, seven in the space between the half-mile and mile radii, and five outside. On the fifth and sixth days, there were eight in the quarter-mile radius, four in the space between the quarter- and half-mile radii, three between the half-mile and mile radii, and four outside, making a total of sixty-nine cases in sixty-five houses. The totals within the different spaces were as follows: twenty in the quarter-mile radius, fifteen in the space between the quarter-mile and half-mile radii, sixteen in the space between the half-mile and one-mile radii, and fourteen outside. Roughly speaking, the population in the different spaces are 10,000, 30,000, 60,000, and 100,000, making up the total population of 200,000 persons. The ratio of cases (*i.e.* infected houses) on this basis would be 2·00 cases per 1,000 population in the quarter-mile radius; 0·50 per 1,000 in the space between the quarter- and half-mile radii; 0·27 per 1,000 in the space between the half-mile and one-mile radii; and only 0·014 per 1,000 in the remainder of the district. These figures, however, especially as regards the population outside the half-mile radius are perhaps scarcely approximative, as I have not received notification of any case under treatment by private practitioners, nearly all the cases being those removed to the Asylum Board's hospitals, or which have become known to me through applications for disinfectants, or as the result of inquiries. As a majority of the persons living in the half-mile radius belong to a class which would send cases of smallpox to the hospital, the ratios now given are most probably fairly approximative as regards those localities. The close grouping of the cases in the quarter-mile radius, as compared with those given in the half-mile radius, and especially in the other spaces, is very marked, and shows the much greater incidence of the disease in the vicinity of the hospital.

	Weeks ending				
	Mar. 6.	Mar. 13.	Mar. 20.	Mar. 27.	April 3.
Hackney	5	4	4	66	15
Islington	6	2	4	14	—
Bethnal Green....	3	1	2	15	—
Shoreditch	1	5	5	11	—
	15	12	15	106	15

I now propose referring to the number of cases in the month of March removed to the Asylum Board's hospitals from Hackney, Islington, Bethnal Green, and Shoreditch, and from all the other districts situated on the north of the Thames. It appears from the books of the Asylums' Board that 168 cases of small-pox were removed between March 1 and March 28 to their hospitals, out of which 142 were removed from the four parishes, viz., from Hackney seventy-nine, Islington twenty-six, Shoreditch twenty-two, and Bethnal Green twenty-one each, or seventy-nine from Hackney against sixty-nine from three other parishes. The population of Hackney in 1881 was 186,462, and of the other parishes 536,417, or about three times as many. There were five cases removed in the week ending March 6 from Hackney, and four, four, and sixty-six in the three succeeding weeks. In Islington the numbers for these four weeks were six, two, four, and fourteen; for Bethnal Green three, one, two, and fifteen; and for Shoreditch one, five, five, and eleven respectively, so that the number from all these places for each of the four weeks were fifteen, twelve, fifteen, and 106. These figures show that a

* Abridged from a paper read at a meeting of the Society of Medical Officers of Health on April 18.

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very decided outbreak took place in the week ending March 27, and that the great incidence of it fell upon Hackney. In the week ending April 3 there were only fifteen cases, against seventy-two in the preceding week, removed from Hackney. There were also several other cases in Hackney which were treated at home.

That part of the district near the hospital, *i.e.* within the quarter-mile radius, suffered in greater proportion than even on later days. The chief incidence of the disease was to the west and south-west of the hospital, and also chiefly out of the line of traffic of the ambulances conveying the sick to the hospital. Besides this, the hospital contained fewer patients in March than in February, and very few patients during the week ending March 13, when the infection of those attacked during the outbreak must have occurred. Besides this, the five cases in Hackney which occurred during the week ending March 13 did not live near to the streets in which those attacked during the outbreak resided, with one exception, and that was in Ash Grove, which is more than a mile away from the hospital, and where the disease had been endemic for some weeks. If neither the route taken by the ambulances, nor the residences of the cases, which might have acted as a centre for the spread of the disease, can account for the outbreak, to what cause can we attribute it? Was it overcrowding of the hospital? No; for there were only twenty-eight cases on an average in it, during the week ending March 13, against above fifty in the early part of February. Was it the removal of convalescent patients from the hospital to the 'Atlas'? To that I must again answer no; as the removal of those patients commenced on February 5, without any corresponding infection, as there was not any Hackney case taken to the hospital between February 15 and March 5, and also because the outbreak did not occur on the route taken by the ambulances. Was it caused by excessive moisture in the air, by the direction of the wind, by prevalence of calms, or any other known meteorological conditions of the atmosphere? These questions can probably be best answered by comparing the meteorology of the periods preceding the times of quiescence and prevalence of the disease.

During the weeks ending March 13 and 20, especially during the latter, the disease was comparatively little prevalent in Hackney, but was not entirely absent, as cases occurred on the 2nd, 3rd, 5th, 6th, 9th, 11th, 12th, 14th, and 18th of the month. On March 5, four cases occurred, but only one was near the site of the outbreak. On March 3 there were four cases, three of which occurred in streets which are situated within the quarter-mile radius, but in one only of these were there attacks during the period of March 20 to 25.

The direction of the wind from January 20 to February 3 (which was a fortnight before February 3 to 16) during which only three cases came to my knowledge in Hackney, was W.S.W. with an excess of speed, so that it blew from the hospital which contained usually about fifty cases in the direction of a densely populated district, also up to February 14, when it changed to E.S.E. by N.E. and continued easterly up to the 19th, when the tendency was S.W. During the week ending March 1 it was variable, but frequently 'easterly,' being S.E. or N.E. on February 28, 29, March 1, 2, 3, and partly 4, but on the 4th it veered to S.W. was S.E. at times on the 8th, 9th, and 10th; N.N.E. on the 11th, S.E. on part of 12th, and then S.W. on the 13th and 14th. As the disease prevailed chiefly to the S.S.W. and W. of the hospital, the wind was not in a quarter to have carried the infection where the disease occurred, unless it veered for a short time, without being noticed, to due E. or E.N.E. on the 8th, 9th, and 10th, which was the direction requisite to spread infection. If the wind spread it, why did it do so then, and not at the end of February and early in March, when it was decidedly favourable for its spread? In February the wind travelled, as a rule, more miles than usual in a day, but from February 26 to March 12 there was a deficiency in the number of miles with the exception of the 4th, 5th, and 10th, when there was a slight excess, the greatest deficiency being on the 6th and 7th, but on neither of these was there anything like a calm. The degree of humidity of the air was below the average on February 29, March 1 and 2, much above it on the 3rd and 4th, much below it on the 5th, somewhat below it on the 6th, 7th, and 8th, much less than it was in the corresponding period of 1882, when the disease was not prevalent in Hackney.

The known meteorological conditions which prevailed during the time that the infection was spread in Hackney were not very different from those in the former part of the year, except that they seem to have been less likely to spread disease from the hospital, especially as there was a total absence of ozone at the end of February, a considerable quantity on the 2nd, 3rd, and 4th of March, and a deficit again up to the 9th.

The facts about this outbreak are few but clear, viz., the disease became prevalent in Hackney on the 20th, and in Islington, Bethnal Green, and Shoreditch on the 21st; that in Hackney alone was there any marked aggregation of cases in one locality, and that chiefly in the vicinity of the hospital, especially within the quarter-mile radius. This aggregation around corresponds very closely with a spot map of 'Deaths from Small-pox in 1871–80.' I think the lines of cases, as shown by the different colours, indicate that it was spread from the hospital by the atmosphere, but the examination of the meteorology of the period does not afford the necessary proof of the mode in, or the cause by, which it was spread.

In conclusion, I would say that no personal communication between infected persons was ascertained by the closest inquiry. The inquiry on this point was as careful as could be, nor, indeed, except at two houses, was there any chance that such communication could have existed.

The closeness of the grouping of cases near the hospital, as compared with the proportion elsewhere, is, in my opinion, the strongest evidence in favour of the theory that the disease was spread in the neighbourhood of the hospital by infective matter borne to the affected persons through the atmosphere. The tendency of zymotic diseases to spread more at certain times than others was well known to the older writers on these diseases, and the same has been often noticed in the present century. Indeed, during the last fifteen years, I have noticed these sudden explosions, as they may be termed, of infectious diseases, especially small-pox, which, as far as I can ascertain, have arisen from some unusual but unknown condition of the atmosphere which tends to make the infective matter occasionally more active than at ordinary periods.

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NURSING SCHOOLS AND THE FUTURE OF NURSING.

THE subject discussed at the second meeting of the Hospitals Association was 'How far should our Hospitals be Training Schools for Nurses?' It was dealt with in two papers, the first by Dr. J. S. Bristowe, F.R.S., the second by Miss Lückes, Matron of the London Hospital. The title chosen was a little ambiguous; nobody questions that hospitals should be used as training schools for nurses, and this was assumed as an axiom in both papers. Hospitals must train nurses for their own use, and the question really raised was to what extent shall hospitals train nurses to supply the existing and increasing demand by the general public, by cottage hospitals, and by other like institutions. There are two sides to the question; does a large training school add to the efficiency of the nursing in the hospital? and, secondly, does it pay?

With reference to the first question Dr. Bristowe laid down the sound doctrine that the nursing school 'ought to be under the immediate control of the governors or committee of management of the hospital or other institution to which it is attached,' and admitted that 'even at St. Thomas's' there was an element of danger in the dual control, minimised, however, by these facts; that the matron of the hospital, who is the servant of the governors, is the appointed head of the school, that the sisters and staff nurses have no official connection with the Home, that the Council of the Nightingale Fund is a small body of gentlemen of high character, and that its secretary is a Governor of St. Thomas's. These pleas in extenuation sufficiently emphasise the possible dangers. As it is the first duty of the physician to minister to the wants of his patients, so it is the first duty of the nurse; teaching holds a subsidiary place. But this necessary limitation does not shackle a really competent teacher. The greatest clinical teachers have ever been most considerate to their patients; how to examine a patient with least discomfort to him, is part of the art which has to be taught; so with nursing. Above all things let us avoid theorising in nursing; precept is well enough, but it is by example that nursing must be taught; nursing is an art, and, to quote again the words of Dr. Bristowe, 'the real education of nurses is obtained by dwelling among the patients, and by studying and ministering to their needs during the varying phases of their maladies.' Lectures by the medical staff or by the matron must always be regarded as of quite secondary importance to practice in the wards, to learning to perform all the practical duties of a nurse in a thoroughly business-like manner; 'it can scarcely,' as Miss Lückes said, 'be to the real advantage of any hospital to open its wards to amateur workers' or idlers. That being so, a training school is of advantage to the hospital by supplying hands more or less trained to assist the responsible and fully trained nurse, and by rendering it possible to lighten the too long hours of labour assigned to the staff-nurses. Hospital nurses in a great many cases are over-worked, and have too little leisure and fresh air; an efficient training school will always supply willing and, to some extent, skilled assistance, and, from among its senior pupils, substitutes during temporary absence.

The demand for skilled sick-nurses by the general public is increasing, and will doubtless continue to increase; the machinery of no large country parish is now complete without a trained parish nurse; in country towns there are the cottage hospitals, and in larger towns the 'District Nursing Associations,' and the 'Sanitary Aid Associations' to supply. In addition to this 'private nursing' absorbs a considerable number. It is clear, however, that the hospitals, whether subscription or endowed, ought not to be called upon to defray the expense of training nurses for other institutions or for private engagements. As a matter of fact, a training school does not pay unless the school maintain a staff of nurses for private cases who earn money for the school to which they are attached, draw fixed salaries according to their ability and the class of cases they nurse, and return to the school-home in the intervals between engagements. In these intervals they are at the disposal of the hospital for use in its wards, and thus supply an element of strength to the nursing staff by forming a reserve.

We cannot at all agree with the view held by the Matron of the London Hospital that hospitals ought not to have a private nursing staff attached; neither do we think that the majority of matrons would agree with her. Her objections are that it involves more changes in the wards than are necessary; that private nurses are not rendered more fit for their particular duties by a return to hospital work; and that finally it is 'unsettling,' both to the nurses who go to private cases and to those who do not. The last objection is the only one that seems to be valid. Changes in the wards may by good management be reduced to a minimum, which is not injurious, but rather beneficial to the quality of the work done in the wards, and the return of private nurses to hospital work is a positive and great advantage to themselves and to their patients. They imbibe new ideas, and refresh their memory of methods and rules rarely required to be observed in private nursing. That nurses are to some extent unsettled is probably true for all, and is due in part, at least, to the considerable sums earned. A nurse receives, perhaps, 30*l.* a year from the Hospital Training School; but while she is nursing private cases she is earning two guineas a week for the school, and receives in addition, as a rule, valuable presents. That is to say, she earns forty-two shillings a week, and is paid twelve shillings a week. Naturally she looks with longing eyes on the odd thirty shillings, and some feeling of injustice rises to reinforce her half-awakened desire to leave the school and earn money for herself, when she reflects that the Hospital Training School, as a rule at least, makes no kind of provision for her age or infirmity. It will nurse her through some acute illness, just as it would nurse any other woman of the same social position who chose to apply to the hospital, but the nurse has nothing to look forward to when she ceases to be useful, whether from age or disease. As a matter of charity or benevolence, she may be kept about the hospital or in the school, but, on the other hand, she has no guarantee; and if she be not a *persona grata*, she will probably be gently dismissed, to find shelter with her friends if she has any, or in the workhouse if she has none, unless she has had the prudence from the earliest days of her employment to lay by the larger part of her wages.

It is greatly to the advantage of the hospitals to attach the best nurses they train permanently to their nursing staff, and it is to the interest of the public also that such a connection should be main-

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tained. Unfortunately, it is not to the nurse's self-interest. The general standard of nurses and nursing is thus lowered. A wise system of providence is the only solution of the difficulty. A nurse who renders herself efficient, and faithfully discharges her duties towards her employers, ought to be able to ensure a provision for her old age, or in case of disability from accident or disease.

To establish a provident system for nurses ought not to be a task of insurmountable difficulty. It is one which the Hospitals Association ought to take up and work out, if it is to discharge the functions it has claimed for itself. A provident scheme can always be rendered safer and cheaper when worked on a large scale. The Hospitals Association claims to supply a connecting link between the various hospitals of this country. Let it, as the first instalment of the advantages which it promises, show us the way practically to remove this nursing grievance.

THE HOUSING OF THE POOR IN BIRMINGHAM AND THE BLACK COUNTRY.

(FROM OUR OWN CORRESPONDENT.)

[*Fourth Article.*]

THE Artisans' Dwellings Inquiry Committee, appointed by the Birmingham Town Council, have brought their labours to a close, so far as the getting together of information and evidence on the subject is concerned. Their next step is to prepare and present a report upon the whole matter. Before proceeding to consider the sanitary and structural condition of the dwellings in the thickly-populated and smoke-begrimed manufacturing and mining district situated between Birmingham and Wolverhampton, it may be as well if we briefly refer to the nature of the evidence given by some of the more practical and experienced witnesses examined by the committee in Birmingham. One of the most important witnesses was Mr. Lawson Tait, F.R.C.S., Chairman of the Health Committee, and a man of large experience and somewhat broad views. The dwellers in houses he classes as those possessing sufficient education and means to look after themselves, and those who, not possessing those qualifications, require the care of a State authority. When the Health Committee of the borough of Birmingham began its work the whole of the houses, practically, occupied by the latter class were provided with middens—a system which, by the way, still generally prevails over the Black Country district. These middens, Mr. Tait says, would mean a square area of 13½ acres of the most offensive and dangerous products of decomposition. The arduous labours of ten years and the expenditure of upwards of half a million of money has succeeded in relieving the borough of only two-thirds of this gigantic evil. They also found thousands of surface wells all over the town, every one of them liable to sewage contamination, and the great majority of them constantly so polluted. Every one of those wells ought to be closed, as there was no safety either for individuals or the public at large in anything but a uniform water supply, constantly watched and guarded against impurity. The Corporation, however, can only deal with the middens in a corresponding ratio with the growth of the interception system, and the progress of sewerage work in these parts is necessarily slow, owing to the difficulties met with from mining operations. The borough surveyor's annual report, however, shows that the public sewers in the borough, constructed up to the end of last year, and now under the charge of the Corporation, amount in length to 184 miles 196 yards. So with regard to the wells, the Health Committee can only close them as the growth of the general water supply, which is in the hands of the Corporation, will admit of such a course. The same difficulty seems to have been experienced in Birmingham that is felt in most other parts of the district; the difficulty of persuading owners of condemned wells that the water is dangerous. Though the results of the analysis be exhaustively explained to them, they will not in many instances believe the water can be impure or contaminated if it be clear and sparkling, whereas if the least discoloration appears, though it may be of a harmless or comparatively harmless character, they at once jump to the conclusion that the water cannot be used. It is often only as the alternative to the infliction of a penalty that the local authorities can get dangerous wells closed. But Mr. Tait is of opinion that, so far as Birmingham is concerned, if the dealing with well-owners were left to the officials and the magistrates' courts, this one branch of Corporation work would be sufficient to upset the proceedings of the Health Committee, and with it the whole progressive policy of the Council. Personal interviews and persuasive means is therefore the course adopted by the committee. The narrow margin of income of many of the small property owners, and the poverty of the tenants, is and has been a great obstacle to the progress of the Corporation in sanitary matters. That class of house is rented at from 2*s.* 3*d.* to 3*s.* per week, but seldom more than half of this reaches the landlord, and in cases where the property is mortgaged, a considerable loss is often sustained, owing to the cost of repairs largely necessitated by damage done by the tenant, and to the loss of income through voids or the inability of people to pay the rent. There seems to be some difference of opinion as to the manner in which the Corporation discharges its duty with reference to the house property owned by it under the Improvement Scheme. Mr. Lawson Tait says the Health Committee has called upon the Improvement Committee to pull down and repair houses in a way they could not have done in dealing with private owners, and that in no case has the rent been raised, even when a sum has been spent more than equal to the original value of the property. The total amount thus spent since 1876 has been 30,500*l.*, and since July last they had had 150 of the tenements belonging to them cleaned, papered, painted, and whitewashed. On the other hand, Mr. Middlemore, a member of the Inquiry Committee, to whom reference was made in a previous article, states that the landlords generally had, up to the end of last year, executed their repairs more quickly and had less unexecuted than the Corporation. In support of this he quotes figures from the health notice books relating to one ward, which show that while in 1882 and 1883 the common landlords executed 68 per cent. of their repairs in the course of two months, the Corporation executed only 29 per cent. Between fifty and sixty cases of overcrowding in the borough were reported last year. The Rev. Canon Bowlby points out that this, as far as his experience goes, is owing to tenants of small houses

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in courts sub-letting the houses in furnished rooms to families who occupied one apartment as bed and sitting room. The rent for each furnished apartment was 2*s.* 9*d.* per week, and the occupants generally in a state of fearful destitution. The people were very migratory, and, if relieved one week, were gone the next. His opinion is that the condition of the people so situated arose partly from want of employment and partly from bad habits. It was not desirable that people should live in one room only, but under the circumstances it would be almost a pity to prevent them, for they would then have nothing but the workhouse to fall back upon. An estate agent, with some 5,000 small houses to manage, expressed his belief that nothing could make courts more cleanly, except such a system of scavenging as was adopted in Glasgow. His opinion concerning the habits of the poorest classes was that, if put into a palace, it would soon be as dirty as their present habitations. It was next to impossible to prevent some of them keeping live animals in the house. There was considerable overcrowding in small houses, but to close them would only be to increase it. A lodger was sometimes taken in a 2*s.* 9*d.* house, where a man, his wife, and a large family already lived. The honorary secretary of the Birmingham auxiliary of the United Kingdom Alliance placed before the committee a number of facts and statistics based on inquiries made by the auxiliary. Invariably the greatest squalor, social discomfort, and indecent habitations, were found to be coincident with the existence of a multitude of public-houses and beer-houses in close proximity, and the most insanitary parts of the borough were those where public-houses were most numerous, and from which also came the largest number of charges of drunkenness and the chief mass of pauperism. In the most sanitary and least pauperised district, twenty-five houses are licensed for the sale of intoxicating drink, while in an insanitary and wretchedly poor district there are thirty-nine such houses, whose takings in twelve months were estimated at 15,210*l.* The borough surveyor (Mr. W. S. Till), in his evidence as to the erection of houses, stated that the new building by-laws came into force in 1876, and that it would not now be possible for such houses to be erected as were mentioned in condemnatory terms by the medical officer of health at an earlier period of the inquiry. Five inspections are now made of all houses put up in the borough; the first when the plans are adopted, the second when the foundations and footings are ready, the third when the damp course is fixed, the fourth when the drains are laid, and the last when the house is completed. The effect of the passing of these by-laws, as well as the necessity that existed for them, was shown in the fact that in one case sixteen houses were standing in a space upon which only ten would now be allowed, and in another case there were twenty where there ought only to be nine.

The number of houses and shops erected in the borough in 1876 was 2,903; in 1877, 2,700; 1878, 1,205; 1879, 1,197; 1880, 1,301; 1881, 1,236; 1882, 666; and 1883, 958: a total of 12,146. A return of compound houses in the borough—that is, houses for which the landlord pays the rates and taxes—let at rents ranging from 2*s.* 6*d.* to 7*s.* per week, showed there to be 65,969 houses rated at 10*l.* and under, and let at rentals up to 7*s.* per week: of these houses 5,273 were void. There are 4,445 houses of a rateable value not exceeding 3*l.* 5*s.*, let at rents up to 2*s.* 6*d.* per week, of which 648 were void; 24,692 rated between 3*l.* 5*s.* and 5*l.*, and let at rents between 2*s.* 6*d.* and 3*s.* 6*d.*, of which 2,125 were void; and 36,832 rated at between 5*l.* and 10*l.*, and let at rents from 3*s.* 6*d.* to 7*s.*, of which 2,500 were void. Some interesting practical evidence was also obtained by the committee as to the manner in which a certain class of house is constructed, and the extent to which the cleansing and repairing is carried. One witness, a carpenter, said he had had considerable experience with regard to the very poor property. Many of the houses in Birmingham were put up in very slight style; the inside shell was often constructed of old bricks. The average rent for a three-roomed house was 6*s.*; they were built back to back, and consisted of a living-room, bedroom, and attic. There were a large number of such houses in one part of the borough, situated within six feet of the middens. The houses let at from 3*s.* 6*d.* to 7*s.* were generally in the worst condition. It was safer to climb up a ladder to bedrooms in some of the houses than to ascend the stairs. A house-painter attributed the ineffectual cleansing to the fact that the landlords and agents would not allow a sufficient sum for the work to be properly done. The prices ranged as low as 8*s.* for white-washing the whole of a three-roomed house, or 15*s.* if the rooms were papered as well. Many landlords would not pay to have the old paper stripped off the walls, and he had known the paper to be twelve and fourteen thicknesses deep. The stench when such a thickness of paper was stripped off was unbearable. In some cases he had known the tenants to sit up all night pulling the old paper off the walls, that being the only way in which they could get it done. A house of this class, he considered, should be thoroughly stripped and limewashed once in three years.

The committee have now to consider what remedy they can apply in amelioration of the evils that have been brought before their notice; and one most important consideration will be, what class of tenement shall be adopted for the housing of the poor in future. There is in England considerable prejudice against the 'flat' system, though it has been counteracted to some extent in London by the erection of the Peabody and other model dwellings upon this principle. The prejudice appears to be very firmly rooted in Birmingham, and nearly all the practical witnesses examined by the committee spoke against the adoption of the system in the borough. On this point Mr. Lawson Tait was able to speak with some authority, having been born and brought up in Edinburgh, where the people are very much in favour of the system. He believed good three and four-roomed dwellings built on the system could be let at 5*s.* per week rent, and that it was decidedly preferable from a sanitary point of view, of course provided that proper ventilation was afforded. The houses were more substantially built, and, less ground being required, could be profitably let at low rents. The old system of 'flats' might possibly conduce to immorality, but the present system prevented it, the tenants acting as a sort of moral detective force one upon the other. Mr. William Henman, a local architect of considerable experience, also approves of the 'flat' system. Although he is of opinion that two-roomed houses, to let at 2*s.* 6*d.* per week, may be built for 60*l.* or 70*l.*, and four-roomed at from 100*l.* to 200*l.*, according to the size of the rooms, he con-

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siders that, under proper supervision, there is nothing like the 'flat' system. The Corporation of Liverpool are trying to solve the artisans' dwellings difficulty in a similar way. In 1868 they erected 146 tenements in flats, and they are now building, under the provisions of the Artisans' Dwellings Act, 272 tenements, which are to embrace every improvement that experience can suggest, and yet will only occupy 3,200 yards of land. The cost of the buildings is to be 55,000*l.*, and the rents are to be 5*s.* 3*d.* for three rooms, 4*s.* 3*d.* for two, and 2*s.* 9*d.* for one. At these rentals they are expected to yield a return of 5 per cent. per annum. (See SANITARY RECORD for March 15, page 437.) The healthiness of the system has been proved wherever it has been sufficiently carried out, and the Birmingham Corporation cannot do better than try an experiment of the kind. The increased comfort, convenience, and cleanliness would soon wear down any prejudice that now exists against it.

Next month we shall deal with one or two of the foul spots in the intermediate district between the two big towns to which we have hitherto chiefly devoted attention.

IMPROVED DWELLINGS FOR LABOURERS AND ARTISANS.*

By T. CHATFEILD CLARKE, F.R.I.B.A., F.S.I.

IN treating of that portion of the subject which may be directly called practical, viz., the character and the extent of the accommodation that has and should be provided, I would suggest two or three principles in new buildings that seem to me essential, though not always observed:—1. It seems desirable to so construct the rooms that through ventilation from back to front should be possible, and that, as a cardinal point in the planning, the rooms be not laid side by side, but as front and back rooms. 2. That the staircase to the blocks or dwellings should be open to the air, and that each set of rooms should have its private door as if the staircase was the street, and that open galleries should be avoided as destructive of privacy. 3. That in every case where it is possible the arrangement of the closets should be on open galleries, or, at least, entered through a scullery or washhouse, with direct access to the outer air. 4. That the plan of lavatories and water-closets off the staircases is not one that should be extensively followed. 5. That a simple and inexpensive system of fireproof flooring should divide the floors throughout. 6. That, when at all possible, some play-yard or drying-ground should be attached to the buildings, and, if possible, washhouses for laundry purposes. 7. That, in planning the buildings, an effort should be made to enable some rooms to be let off as single rooms, with a power, however, of adding two or three together if needed. 8. To preserve, as far as possible, a cheerful and cottage style of dwelling, as opposed to dull and heavy blocks. 9. Care should be taken that all the sanitary and other appliances should be of the simplest, yet, at the same time, of the strongest character. 10. As a sanitary aid in the construction of such dwellings, that the walls and the ceilings be of the hardest material possible, and able often to be cleansed. The application of these principles is not always easy, and specially as to the question of single rooms. It cannot be denied that much of the usefulness of this movement would be lost if the plan was largely resorted to of constructing and letting single rooms; but the cost of more than one room has been, practically, the greatest obstacle to the very poor occupying such dwellings, and after the remarkable evidence of Mr. Marchant Williams, one of the inspectors of the schools for the London School Board, to the effect that, in the Finsbury Division, there are 10,490 families living in one room only, consisting of 41,044 persons, and that there are 17,210 families living in two rooms only, and consisting of 82,215 persons, this portion of the subject calls for the most careful attention (see SANITARY RECORD for March 15, p. 458). Such facts as these make it gravely worth consideration whether it is not possible to design and execute at a cheaper rate than hitherto a class of dwellings having some sort of privacy in the sleeping relations, and yet much cheaper in execution than a system of divided rooms; and the idea has occurred to me that, supposing you extend somewhat the area of the common room, and have a series of partitions movable, either made to hinge or slide, by which you could form bed-closets, not going absolutely to the ceiling so as to interfere with a free circulation of air, but by a little intelligent contrivance on behalf of the designer to render possible a division of the sexes, and at the same time in the daytime to enable such partitions to lie back against the walls.

It would be a mistake to consider that the progress in supplying improved dwellings for the industrial classes has either been few or small. It must be patent to all who know London that private enterprise has, in many parts of the metropolis, supplemented the work of societies and associations.

In Clerkenwell, Newington, the Kent Road, Newport Market, Tooley Street, opposite Reid's brewhouse, on the edge of Farringdon Street, and elsewhere, blocks of buildings have been erected, substantial in character, some of them showing good financial results, and affording healthy and comfortable homes for the better portion of the artisan classes; and when we come to inquire into the work of the various associations and societies, we must be hopeful that an effect appreciable and material both as to the health and comfort of the people has been attained.

Taking the reports of 1883, furnished by the societies, I find that the Metropolitan Association for Improving the Dwellings of the Working Classes, which was, in a measure, the pioneer in the movement, being its thirty ninth report, are housing 5,984 persons, with a death-rate as low as 17·2 per 1,000, declaring a dividend of 5 per cent., and possessing a reserve fund of 15,000*l.*, with a total capital account of over 250,000*l.* I am glad to report that this Association have it in contemplation to erect some sets of dwellings of one and two rooms only, to accommodate tenants of smaller means than their average as now built.

The Improved Industrial Dwellings Company report that with their works in hand they will house about 25,000 persons, having 4,814 dwellings, 140 shops and workshops, with a capital account of about 900,000*l.*, and a rent-roll of 100,000*l.* per annum in round numbers, the sanitary condition of the dwellings receiving careful attention. This company also

* Abridged from a Paper read before the Surveyors' Institute, April 21.

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manages 153 improved dwellings, belonging to private persons and to another association.

The Artisans', Labourers', and General Dwellings Company, which developes estates in a somewhat different way, has a large work in hand. Considerable areas of land, like that at Shaftesbury Park, the Queen's Park, and Noel Park, are purchased, roads formed, and cottage dwellings erected capable of accommodating a single family, but the houses are wisely planned of greater and lesser size to meet the wants of different classes. This company, possessing over 4,000 houses, having a capital and liabilities of over a million and a quarter of money, is now proceeding to cover Noel Park at Hornsey, and has a present rent-roll of over 55,000*l.* per annum. Taking a low average of five persons to a house, the present population must be 20,000, with a large prospective increase.

The Peabody Fund are doing a large and beneficent work. Up to the end of 1883 they had provided for the dwelling of 18,009 persons in 4,359 separate dwellings, with 692 of one room each, 2,073 of two rooms, 1,521 of three rooms, and 73 of four rooms. They have expended 1,089,883*l.* 12*s.* 6*d.* on land and buildings, with a net gain on the year from rents and interests of 25,252*l.* 16*s.* 2*d.* The death-rate was 18·60 per 1,000, the birth-rate was high, and the infant mortality low. It is right to state that the average weekly earnings of the head of the family was 1*l.* 3*s.* 8*d.*, and the average rent of each room, 2*s.* 1¼*d.*, such rent including the free use of water, laundries, sculleries, and bath-rooms. Such a record does not pretend to exhaust in any way the accounts even of the associations in existence.

I have referred before to a block of buildings erected by the Fishmongers' Company in Walworth, which contains 255 rooms, including a few shops, in ten blocks of dwellings, and, taking an average of five to a family, probably containing 1,275 persons in residence. The peculiarity of this block is that the cottage system has to some extent been preserved, as the buildings are not high, consisting only of four stories, yards being preserved in the rear.

I have also to record an experiment made at the foot of Southwark Bridge to bring the homes of the working classes close to their daily vocations.

In another instance I have to record with pleasure an experiment made by some friends and myself, where, in Lever Street, City Road, a block of buildings has been erected, not unattended with fairly commercial results, where the plan is wisely adopted of a personal supervision of the dwellings by ladies, and a kindly communication kept up with the tenants, thus assisting in the idea so admirably maintained by Miss Octavia Hill and her band of workers.

I mention these few individual results to illustrate how possible it may be, in many neighbourhoods of London and elsewhere, to initiate schemes which may have a good and beneficial tendency.

NEW INFECTIOUS DISEASES HOSPITAL FOR NEWCASTLE.—After repeated discussions, extending over two years, the Corporation of Newcastle have at length decided that the proposed new hospital for infectious diseases shall be erected on a site at Heaton belonging to the Corporation, and situate between the railway lines to Tynemouth and Berwick—being about 2¾ miles from the centre of the city, and well isolated from a crowded population. The new hospital will be erected from the approved designs of Mr. Arthur Gibson, Architect, at an estimated cost of about 30,000*l.*

THE PRESENT SANITARY CONDITION OF SOME AMERICAN PRISONS AND HOSPITALS.

(BY OUR AMERICAN CORRESPONDENT.)

IT is certainly true that social science and the art of sanitation go hand in hand, that the latter is the handmaid of the former, and that without sanitation the carefully developed plans of social science would be of no effect. The science tells us what is wanted; the art (for sanitation has now reached such distinction that it is no longer merely science) shows us the more practical how to do it.

The following brief account of some recent hygienic reforms and of the present condition of some American prisons and almshouses necessarily comes under the second of the sister studies. Social science has been teaching us for years the necessity of providing properly for our dependants; but I cannot but wonder what practical results this teaching would have brought about had not sanitary engineering, with its manifold applications, come suddenly into life, and wrought its wonderful work. And it is this consideration which leads me thus to preface this paper.

Most of our hospitals for the insane are fortunate in having capable physicians for superintendents, and physicians, moreover, who are thoroughly awake to the sanitary questions of the day, and who are willing to profit by the most advanced knowledge pertaining to sanitation. Indeed, if the suggestions of these superintendents, made in their annual reports, were acted upon, and carried out to the letter, our hospitals would be ideally correct in all their appointments; the failure which must be chronicled in too many instances rests with negligent boards of directors and niggardly trustees.

In the Pennsylvania Hospital for the Insane all the drainage is underground, the waste water being carried off at a sufficient distance below the surface. The entrances to the culverts are trapped. These culverts are large enough to obviate risks of obstruction. Dr. Kirkbride, probably the best-known superintendent in America, has long opposed the erection of temporary wooden structures for the use of the insane, as their condition soon becomes unfavourable to the health of the patients. At the Pennsylvania Hospital, over which he has presided for a number of years, all the buildings are of the most solid character, the department for males accommodating 250 patients, and the infirmary ward twenty patients. Dr. Kirkbride has been very careful in his endeavours to secure the *natural* ventilation, without which the best systems of forced ventilation are of little account. To quote his own words:—'Although a forced ventilation is deemed indispensable in every hospital, still a natural ventilation should never be neglected. In most parts of the United States, during one-half the year, there is a comfort in the fresh, cool breezes, which may often be made to pass through the wards, that cannot be too highly estimated, and every precaution should be taken to derive full advantage from them. The darkest, most cheerless, and worst ventilated parts of such establishments will generally be found to be where a wing joins the central building, or where one wing comes directly in contact with another running at right angles to it. The first of these defects, however, is easily and effectually remedied by leaving on each side an open

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space of ten or twelve feet, with movable glazed sash extending from near the floor to the ceiling, and which may be either accessible to the patients, or protected by ornamental open wire-work, on a line with the corridor. This arrangement gives nearly every advantage of light, air, and scenery. Behind such a screen, even in the most excited wards, may be placed with entire security the most beautiful evergreen and flowering plants, singing birds, jets of water, and various other objects, the contemplation of which cannot fail to have a soothing effect upon every class of patients. To remedy the other difficulty alluded to, instead of allowing a second wing to come directly in contact with the first, it should be placed on a parallel line, but made to recede just so far as will allow its corridor to be open at both extremities, or as much more as may be deemed advisable; and these ends should also be furnished with movable glazed sashes, terminating in a bay window, accessible to the patients, or protected and ornamented as already suggested. . . . If the second range of windows is placed at right angles with the first, the same arrangement is required as that suggested where the first wing joins the central building. I deem this mode of finish of great importance. . . . These open arrangements, where one ward joins another, give all possible advantages of light and air, and are infinitely preferable to structures entirely detached, which, besides being more expensive, without having compensating advantages, have many inconveniences that must be obvious to those who are practically familiar with the management of hospitals.'

These directions have been carried out in the Pennsylvania Hospital with perfect success. It is the best and only reasonable way of overcoming the difficulty. In connection with the excellent system of forced ventilation in use here, the shafts terminate on the projecting portions of the wings, and in the central dome. The cellars and ice houses are ventilated by means of flues leading out through the roof. No fire is used in any part of the house, except in the kitchens, baking, and ironing rooms. In the boiler room the escaping gases enter a common flue, and the draft is regulated by a damper at the back end of each boiler, the supply of air being graduated by a register in the ash-pit door. Steam is carried from the boilers in 5-inch welded iron pipes, and, on reaching the hospital, is distributed in eighty-three air-chambers placed in its cellar, with direct flues leading to the apartments above. The gases from the boiler fires pass through an underground flue 4 × 6, ascending 31 feet in its course until, at a distance of 557 feet, it reaches the foot of the main chimney, which rises 78 feet above the surface of the ground. This chimney is built double, the interior being round, formed of hard brick, without pargeting, 6 feet in diameter, from bottom to top. The foundation is of pointed stone work, and the top of cast iron. This affords the ventilating power for securing a strong downward draught of air through all the closets, urinals, sinks, and tubs.

As steam is the favourite agent for warming buildings of this sort, so fans are the commonest, and best, means for forcing the ventilation. The fan used in this hospital is of cast-iron, with an extreme diameter of 16 feet. It receives air on both sides through openings 12 feet in diameter, the supply coming from a tower 40 feet high. All surface exhalations are in this way avoided. The air is then forced through a duct, at its commencement, 8½ + 10½, into the extreme parts of the building. From the cold-air duct, openings lead into different warm-air chambers. The warm air is admitted near the floor, except in certain rooms reserved for invalids, where it is admitted near the ceiling.

Some of our hospitals do not take proper precautions against fire—always a dangerous possibility. Not so in this model establishment. There are always about 20,000 gallons of water in the tanks: 15,000 gallons per hour may be placed there by the pumping engines. A standpipe passes into every story and every ward, with hose constantly attached.

Hospital water-closets, not long ago, were such positive nuisances that it was actually proposed to do away with them altogether. In our best buildings they are now more or less satisfactory. In the Pennsylvania Hospital there are small rooms used for that exclusive purpose. There are external windows, the floors are arranged so as to absorb moisture, and only iron and china ware are used in the apparatus. As already stated, a strong downward ventilation is secured by connection with a specially heated flue in some cases, in others, with the main chimney. I think that there is one closet for every ten persons. The urinals are of cast iron, and have a good ventilation and a steady flow of water, and the same may be said of the slop-hoppers.

The drying-rooms of hospitals have, until lately, been a great source of unpleasant odours. The 'hospital smell' has passed into a by-word to express the sensation produced on the olfactories by the odours exhaled from wet cloths, brushes, &c. To remedy this, Dr. Kirkbride has arranged a series of rooms thoroughly heated by steam-pipes, and with a good current of air always passing through them, in which all articles are placed after being washed until dry. They communicate directly with the main foul air ducts.

The kitchens and bakeries are on arches, for additional security, and to prevent the steam and odours from passing to the rooms above. Ventilating shafts have been built for the kitchens, in which a strong upward draught is secured by carrying up in its centre a cast-iron flue of good size, through which the gases from the fires pass. The floors are of smooth brown German flagstone; wood is carefully avoided.

In conclusion, this hospital has a complete system of steam-heating, forced and natural ventilation, water-works, engine-house, laundry, and fifty acres of beautiful pleasure-grounds. The daily life of the patients is about as follows: Rise at 6, breakfast at 6.30, after which the rooms are put in order preparatory to the visit of the medical officers. At 8, or 9, the patients start out on drives or walks, on returning from which they may visit the museum, gymnasium, &c. Dinner at 12.30. Exercise again until 6 or 6.30. Lectures or entertainments in evenings until 9.30, when all retire. There is some kind of amusement going on each night. On Sundays all unnecessary labour is avoided, and those who are able are permitted to attend the various places of worship. Some such routine as this is followed in nearly all our hospitals, and it will be seen that all possible means are taken to provide for the healthy entertainment of the unfortunate beings who are for the time under the care of the State.

The Alabama Hospital for the Insane has one advantage over the establishment just described,

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and that is—it is built on the 'linear plan.' In other respects it does not differ materially from the Pennsylvania institution, although it is perhaps not so nearly perfect in its minor arrangements. The fresh-air chamber is in the cellar, which extends through the entire building, and in which the radiating steam pipes or cast-iron radiators are placed. At the extreme end of some of the wards there are three single rooms, intended for violent patients, in which are close-stools strongly secured to floor and wall, and with strong downward ventilation. The water is controlled by attendants. The height of the ceilings in the rooms occupied by patients varies from 12 feet to 16 feet. The lecture room has a height of 24 feet. The corridors are wide and airy.

The linear plan is acknowledged to be superior to others. Dr. Kirkbride offers one improvement upon the Alabama building, which is good, but which might be better. 'Place the adjoining wards a few feet further from one another, giving room for a fireproof stairway, and securing a greater amount of separation between the wards.' The benefits of the linear plan are briefly as follows:—A freer circulation of light and air is secured, better prospects are obtained from the patients' rooms, and there is less danger of their seeing one another, which is a very important consideration when both sexes occupy the same building.

Another well-known hospital is that stationed at Middletown, in the State of Connecticut. The chief defect here is owing to the deafness of the State authorities to the appeals of the able superintendent for the erection of other buildings. The consensus of professional opinion is agreed that 250 patients are sufficient for the intelligent care of a hospital, and that an excess over this number will prove unwieldy. There are over 900 patients in the Connecticut Hospital, and the superintendent wisely discourages proposals to enlarge the accommodation, but urges, on the contrary, the necessity of building other hospitals in other parts of the State. This is the only refuge of the kind in Connecticut, yet Pennsylvania has several (two within the city limits of Philadelphia), and Massachusetts has five State hospitals, besides private institutions of a like nature. Still, until the State officials consent to build these additional hospitals, charity seems to demand that this one should be used to its fullest extent. It is, therefore, overcrowded, and chronic patients are forced into a separate building—a bad arrangement, for obvious reasons.

With this radical defect—owing, it must be remembered, to no fault of the superintendent, Dr. Shew, or the painstaking board of trustees, but to a negligent senate—the Connecticut Hospital is an excellent example of what sanitation can do. There is a good water-supply, every ward containing a supply-pipe, and 150 ft. of hose always attached and in place. Two large reservoirs are connected with the hospital by a 6-in. cast-iron main; the upper reservoir is 164 ft. above the first-floor level of the hospital, and water can be thrown above any portion of the roof. A 6-inch line of pipe extends around the building, with twenty-four hydrants placed at equidistant points. [The failure to take such precautions as these resulted in the total loss of the Minnesota Hospital, burnt a few years ago.]

All ventilating flues are carried in brick out of the roof as separate chimneys. Pure air is supplied to each stack by flue-boxes leading directly out of doors. In the sitting-room, and at the extremities of the corridors, a direct radiator is fixed, which may be used in cold weather. The ventilating flues extend from near the floor in every room up and out of the roof, as mentioned above. Fans are not in use, as there are two large open fireplaces. The 'Mott' improved cast-iron bath tub is used in the bath-rooms. There is hot and cold water supply, and the 'McFarland' patent waste and overflow. A steam fire-proof drying closet opens from each bath-room. The w.c.'s are furnished with two cast-iron stationary hoppers, flushed automatically with a gallon of water from a 'McFarland Automatic Flushing Tank.' The discharge occurs every two minutes. The slop-hoppers and urinals have the same automatic supply. Bower's traps are used on all waste-pipes. The main soil-pipes are of heavy cast-iron, 6 inches in diameter, and a complete circulation of air is maintained. There seems to be no trouble caused by escape of foul air from the joints. All the external walls consist of an 8-inch outer wall, a 4-inch air space, and an 8-inch inner wall. The two walls are bound together by galvanised iron clamps. The floors are of hard maple, planed, tongued, and grooved.

As I have said, our superintendents are mostly men of large practical experience and level-headed sanitarians. They make a study of the problem, and the result can be seen by those who have eyes to see and minds to understand. As an example of their legislation, I clip some items from the resolutions passed in 1851—and which have never been altered—by the Association of Medical Superintendents in the United States:—

1. Every hospital for the insane should be in the country, not within less than two miles of a large town, and easily accessible at all seasons.

2. No hospital for the insane, however limited its capacity, should have less than fifty acres of land devoted to gardens and pleasure-grounds. At least 100 should be possessed by every State hospital, or other institution, for 200 patients.

3. Means should be provided to raise 1,000 gallons of water daily to reservoirs that will supply the highest parts of the building.

5. The highest number that can with propriety be treated in one building is 250, while 200 is a preferable maximum.

9. No apartments should ever be provided for the confinement of patients, or as their lodging-rooms, that are not entirely above ground.

10. No class of room should ever be constructed without some kind of window in each, communicating directly with the external atmosphere.

18. The departments for washing clothing, &c., should be detached from the hospital building.

19. The drainage should be underground, and all the inlets to the sewers should be properly secured to prevent offensive emanations.

20. All hospitals should be warmed by passing an abundance of pure fresh air from the external atmosphere over pipes or plates containing steam under low pressure or hot water, the temperature of which at the boiler does not exceed 212° F., and placed in the basement or cellar of the building to be heated.

23. All water-closets should, as far as possible, be made of indestructible materials, be simple in their arrangements, and have a strong downward ventilation connected with them. It was also unanimously resolved at this meeting that 'a complete system of forced ventilation in connection with the heating is

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indispensable to give purity to the air of a hospital, and that no expense that is required to effect this object thoroughly can be deemed either misplaced or injudicious.'

These gentlemen are fond of studying the systems of other countries also, and profiting, if possible, thereby. Dr. Shew visited the English asylums in 1878, and says that less attention is paid to heating and ventilation there than with us. One superintendent told him frankly that he knew nothing about ventilation or its principles, as that belonged to the engineer. The SANITARY RECORD, however, has doubtless since then convinced such overseers of their error.

I have thus instanced three of our leading hospitals as fair types of the present condition of affairs, and in so doing have given them more than their share of space. I pass quickly to the next branch of the topic.

Almost every community now has its 'poor-house.' Either the city, town, or States is obliged to look after paupers. Social Science has brought this about. What has its handmaiden done? I can, of course, only speak most generally, but I shall not be contradicted when I say that there has been a marked improvement within the last decade in regard to the sanitary conditions surrounding the inmates of our almshouses. The following is the observation of a Bostonian examiner, who was sent out, only a few weeks ago, to make a report upon the suburban poor-houses around the great New England city. I have put his language into a condensed form of my own.

Some places, as Chelsea and Somerville, have no poor-houses of their own, but support their indoor paupers in the buildings of other cities. Through charity relief associations they aid the paupers of their districts in their own homes, or in provided homes if they have none. This they find a cheaper method than sending them to the almshouse. At Malden there is ample provision for light and ventilation, the food is good, and everything is scrupulously clean. The only objectionable feature are the feather-beds, which are not so health-preserving as other sorts. There is a complete bath-room, into which those who enter the house for the first time are hurried. The building is heated by steam, the water is drawn from a pure well, and such a thing as contamination has never been known. The closets are well ventilated and trapped, and the sewage is carried to a pit some 200 yards distant, from which it is taken at frequent intervals and composted for use on the farm. The able-bodied paupers work on this farm, which supplies its own vegetables.

The Cambridge Almshouse is described as a model. The beds are ticks well filled with straw, which is changed once a month. The Newton house is the only one of all those surrounding Boston where the old privies are still in use. This institution has a farm of sixty-eight acres, and the enterprising superintendent sold, last year, 1,800 dols. worth of produce from it, outside of what was used by the inmates themselves. He makes the boast that he supports the paupers of Newton at 1·44 dols. *per caput* a week, a thing which no other superintendent has been able to accomplish.

Occasionally, we hear of a large poorhouse still in a state of unhealthfulness. Such, for instance, is the condition of the Philadelphia Almshouse, which might, and which should be, one of the leading charitable institutions in the world. It is now a mass of impurity; but the local papers are thundering their editorials against its managers, and reform is already on the way towards its relief. It is comfortable to think that such a state of things cannot last long nowadays in this country at least.

I believe that the sanitary condition of our large penitentiaries is now excellent. They are under the surveillance of State Commissioners, who, when they are honest men as well as politicians, are very careful to do their best towards correcting all possible mistakes. The Pennsylvania Commissioners, for instance, in referring to their annual visit to the Eastern Penitentiary, report that the cells are well ventilated, and that the plumbing has been done in the most complete and workmanlike manner.

Owing to the exertions of these same gentlemen, the authorities of the State Lunatic Asylum at Harrisburg have had all the water-closets on the premises carefully renovated. Perhaps the chief source of complaint against most prisons is the absence of perfect ventilation. There are in too many buildings of this kind separate fires in each room, and the smoke nuisance, as a consequence, is considerable. All prisons are very careful in seeing that the inmates are kept clean by frequent washings.

But it is our country gaols which need the reforms which have accomplished so much for the larger penitentiaries and hospitals. I give below a sample of some of the Illinois hotbeds of vice, ordinarily called gaols; and although I am constrained to believe that these are rather worse than the average, they are still common enough to draw down upon them sanitary condemnation and sanitary reform.

In one of these gaols the cells are very small, absolutely dark, and with no ventilation whatever. The windows are a mockery: they are so heavily grated that neither air nor light can enter. The corridor is two feet wide around the cells, on the four sides. In another there are no privy seats, no water, no furniture, no conveniences, *no special cells for female prisoners!* These gaols are stifling in summer and desperately cold in winter. Occasionally one of these horrible abodes is burnt down, which is a double blessing to the community, because a pest is thereby got rid of, and a better building is put up in its place. Other gaols in this State are described as being dank and poisonous, with rotting floors and walls. The deaths are, of course, innumerable; but one shudders to think of the spiritual deaths which these hellish places engender—places which should be reformatories, and lighted with the light of a beneficent charity.

The pen of a Dickens and the heart of a Howard are needed to accomplish reform in such desolation. The Illinois commissioners are doing their utmost to bring about the necessary changes; and let us hope that before many years their endeavours, as well as those of other workers, may be crowned with success.

BROMPTON ORATORY.—The artificial lighting of the new Oratory at Brompton, which was opened recently by Cardinal Manning, has been effected by the Sanitary Engineering Company, of Westminster, with the 'Albo Carbon' Light.

MARTYRS TO CLEANLINESS.—Twelve out of fifteen members of the Bromsgrove Local Board and Urban Sanitary Authority have resigned, in consequence of the Local Government Board having suggested that a scheme for the erection of baths should stand over for six months.

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THE REGISTRAR-GENERAL'S LAST QUARTERLY RETURN.

By J. HAMPDEN SHOVELLER.

THE Registrar-General has just issued his usual quarterly return of marriages, births, and deaths in England and Wales. The statistics relating to marriages are for the fourth quarter of 1883, and those relating to births and deaths are for the first three months of this year. The marriage-rate showed a very slight increase upon that recorded in the same period of the preceding year; the birth-rate and the death-rate were considerably below their respective averages. At the Royal Observatory, Greenwich, the mean temperature during the quarter was 43°·4, and exceeded by no less than 4°·7 the average for the corresponding period of 113 years. The rainfall amounted to 4·64 inches, and was rather more than one-third of an inch below the average amount.

During the fourth quarter of 1883 the marriages of 123,648 persons were registered in England and Wales, equal to an annual rate of 18·3 per 1,000 of the population, estimated by the Registrar-General to be rather more than twenty-seven millions of persons in the middle of this year. This marriage-rate, though slightly above that recorded in the corresponding quarter of the preceding year, was below the mean rate in the same period of the ten years 1873–82.

The births registered in England and Wales during the first three months of this year were 224,694, and equal to an annual rate of 33·2 per 1,000 of the estimated population. This birth-rate was lower than that recorded in the first quarter of any year since 1850. In the several counties the birth-rate ranged from 24·4 in Rutlandshire, 25·3 in Herefordshire, and 26·5 in Huntingdonshire, to 37·7 in Staffordshire, 37·9 in Durham, and 38·2 in Nottinghamshire. The natural increase of the population of England and Wales during the quarter, or the excess of births over deaths, was 92,597. From the Board of Trade returns it appears that 45,492 emigrants embarked during last quarter from the various ports of the United Kingdom at which emigration officers are stationed. Distributing those whose nationality was undistinguished, and excluding foreigners, the emigrants of British origin were 37,829, including 25,758 English, 4,279 Scotch, and 7,792 Irish. The proportions of British emigrants last quarter to a million of the respective populations of the three divisions of the United Kingdom were 949 from England, 1,107 from Scotland, and 1,573 from Ireland. Compared with the proportions in the corresponding quarter of 1883, emigration last quarter showed a decline in each of the divisions of the United Kingdom.

It appears, from returns published by the Local Government Board, that the average number of paupers relieved on the last day of each week in the first three months of 1884 was 723,403, of whom 186,606 received indoor and 536,767 outdoor relief. The proportion of the population in receipt of pauper relief last quarter showed a decline from that recorded in the corresponding period of 1883.

The deaths of 132,097 persons were registered in England and Wales during the first quarter of this year, corresponding to an annual rate of 19·5 per 1,000 of the estimated population. This death-rate was as much as 3·7 below the mean rate in the cor-

Analysis of the Vital and Mortal Statistics of the Twenty-eight Great Towns, dealt with in the Registrar-General's Weekly Returns, for the First Quarter of 1884.

Towns.	Estimated Population middle of 1884.	Births.	Deaths.	Annual Rate per 1,000 Living. Births.	Deaths.	Principal Zymotic Diseases.	Deaths from Principal Zymotic Diseases.	Small-pox.	Measles.	Scarlet Fever.	Diphtheria.	Whooping-cough.	Fever.	Diarrhœa.	Rate per cent. of Uncertified Deaths.	Deaths of Children under one year of age to 1,000 Births.
28 Towns	8,762,354	77,354	46,153	35·4	21·1	2·6	5,769	205	1,319	1,218	372	1,665	564	426	2·5	139
27 Towns	4,742,993	42,460	25,771	35·9	21·8	2·6	3,070	145	770	828	164	561	323	279	3·4	142
London	4,019,361	34,894	20,382	34·8	20·4	2·7	2,699	60	549	390	208	1,104	241	147	1·4	135
Brighton	112,954	826	547	29·4	19·4	1·4	39	—	8	4	4	20	3	—	1·5	151
Portsmouth	133,059	1,174	613	35·4	18·5	2·6	87	—	62	2	7	2	11	3	1·0	87
Norwich	90,410	845	442	37·5	19·6	1·4	31	—	22	2	1	1	2	3	2·5	127
Plymouth	75,509	639	376	34·0	20·0	1·1	20	—	8	1	3	1	3	4	1·1	119
Bristol	215,457	1,663	1,003	31·0	18·7	0·9	50	—	8	9	3	15	6	9	2·8	144
Wolverhampton	78,367	702	376	36·0	19·3	1·6	31	3	11	7	2	1	3	4	7·2	130
Birmingham	421,258	3,799	2,133	36·2	20·3	2·7	285	54	82	47	21	33	23	25	1·7	131
Leicester	32,773	1,232	625	37·2	18·9	1·7	57	—	1	26	2	16	7	5	2·7	151
Nottingham	205,298	2,130	1,106	41·6	21·6	2·8	144	—	72	10	5	32	16	9	2·3	152
Derby	87,608	717	382	32·8	17·5	1·8	39	—	30	1	1	4	1	2	1·3	105
Birkenhead	90,870	845	465	37·3	20·5	2·2	50	—	26	10	1	3	5	5	4·3	114
Liverpool	573,202	5,133	3,325	35·9	23·3	2·7	388	29	83	62	15	109	62	28	4·9	144
Bolton	108,968	958	590	35·3	21·7	2·4	64	—	—	1	3	46	7	7	1·9	145
Manchester	338,296	3,069	2,346	36·4	27·8	4·0	337	2	173	92	5	76	10	39	2·7	173
Salford	197,153	1,797	1,113	36·6	22·6	3·8	185	—	73	41	4	32	16	19	4·9	159
Oldham	122,676	1,148	767	37·6	25·1	3·3	100	—	70	9	1	3	7	10	6·0	186
Blackburn	110,498	998	601	36·3	21·8	2·7	73	—	9	20	1	2	21	20	3·2	168
Preston	99,481	951	612	38·4	24·7	2·2	54	—	1	25	4	1	8	15	3·8	165
Huddersfield	86,004	933	435	29·5	20·3	1·8	38	—	3	3	2	24	—	6	4·4	147
Halifax	76,479	530	425	27·8	22·3	0·8	16	—	—	4	2	3	5	2	8·0	125
Bradford	209,564	1,487	960	28·5	18·4	0·9	47	—	14	2	1	7	17	6	3·0	146
Leeds	327,324	2,887	1,960	35·4	24·0	4·7	384	—	55	240	26	19	23	21	1·7	131
Sheffield	300,563	2,734	1,664	36·5	22·2	3·1	231	2	11	129	4	54	18	13	5·5	150
Hull	181,225	1,695	861	37·5	19·1	1·7	76	—	1	17	22	12	16	8	6·4	126
Sunderland	123,204	1,379	688	44·9	22·4	2·7	84	52	—	7	10	3	9	3	2·2	124
Newcastle-on-Tyne	151,325	1,469	865	39·0	22·9	3·1	117	3	7	48	6	33	11	9	3·6	150
Cardiff	91,468	1,020	491	43·8	21·1	1·9	43	—	—	9	8	9	13	4	2·2	129

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responding period of the ten years 1874–83, and was considerably lower than in any winter quarter since the civil registration of births and deaths was first established in 1837. This exceptionally low rate implies that no fewer than 33,600 persons survived the three months ending March last, who would have died had the death-rate corresponded with the average rate in the 46 preceding March quarters. In the various counties the death-rates ranged from 15·9 in Westmoreland, 16·4 in Dorsetshire, and 16·5 in Sussex, to 21·8 in Lancashire, 22·6 in Monmouthshire, and 22·9 in Cornwall. In the urban districts, comprising the chief towns and containing an estimated population of nearly sixteen-and-a-half millions, the death-rate last quarter averaged 20·5 per 1,000; in the remaining, or rural, population of about ten millions and three quarters, the rate of mortality did not exceed 18·0 per 1,000. These urban and rural rates were respectively 4·1 and 3·2 per 1,000 below their average rates in the ten preceding corresponding quarters.

In twenty-eight of the largest English towns, including London, and having an estimated population of 8,762,354 persons, the death-rate during the first quarter of this year averaged 21·1 per 1,000, and exceeded by 0·6 the general urban rate. While the death-rate did not exceed 20·4 in London, it averaged 21·8 in the twenty-seven provincial towns, among which it ranged from 17·5 in Derby, 18·4 in Bradford, and 18·5 in Portsmouth, to 24·7 in Preston, 25·1 in Oldham, and 27·8 in Manchester. The death-rates at different ages in these twenty-eight towns showed the usual wide divergence; it may be noted that the rate of mortality among infants in these towns, measured by the proportion of deaths under one year of age to 1,000 births, ranged from 87 in Portsmouth to 186 in Oldham; that the death-rate among persons aged between one and sixty years was only 9·9 in Bristol, but as much as 18·7 in Manchester; and that among persons aged upwards of sixty years the rate of mortality ranged from 60·6 in Norwich to 97·6 in Halifax.

The 132,097 deaths in England and Wales during last quarter included 30,143 of infants under one year of age, 66,316 of children and adults aged between one and sixty years, and 35,638 of persons aged sixty years and upwards. Infant mortality was equal to 134 per 1,000 births, and was considerably below the average of the ten preceding corresponding quarters. In the twenty-eight large towns the proportion of infant mortality averaged 139 per 1,000; it was 135 in London, and averaged 142 in the twenty-seven provincial towns, among which it ranged from 87 and 105 in Portsmouth and Derby, to 173 in Manchester, and 186 in Oldham. The death-rate in England and Wales, both among children and adults, was considerably below the average.

The deaths registered in England and Wales during the first quarter of this year included 13,552 which were referred to the principal zymotic diseases; of these, 3,265 resulted from scarlet fever, 3,034 from whooping-cough, 2,516 from measles, 1,671 from 'fever' (including typhus, enteric fever, and also simple and ill-defined forms of continued fever), 1,481 from diarrhœa, 1,270 from diphtheria, and 315 from smallpox. These 13,552 deaths were equal to an annual rate of 2·00 per 1,000, against an average rate of 2·55 in the ten preceding corresponding quarters. In the twenty-eight great towns this zymotic rate averaged 2·64 last quarter, and ranged from 0·84 and 0·90 in Halifax and Bradford, to 4·00 in Manchester, and 4·71 in Leeds. In fifty other large town districts this zymotic death-rate averaged 2·16 per 1,000, while in the remaining or rural portion of the country it did not exceed 1·62 per 1,000.

Scarlet fever was the most fatal zymotic disease in England and Wales during the first quarter of 1884. The 3,265 deaths referred to this disease were equal to an annual rate of 0·48 per 1,000; which was, however, considerably below the average rate in the ten preceding March quarters. In the twenty-eight towns the highest scarlet fever death-rates were 1·72 in Sheffield and 2·94 in Leeds; among the fifty other large towns the rate was equal to 2·80 in Middlesbrough, 3·57 in Ashton-under-Lyne, and 4·74 in Wigan. The 3,034 fatal cases of whooping-cough were equal to an annual rate of 0·45 per 1,000, against an average rate of 0·63 in the March quarters of the ten preceding years. The highest death-rates from this disease last quarter in the twenty-eight towns were 1·10 in London, 1·12 in Huddersfield, and 1·69 in Bolton. The deaths referred to measles corresponded to an annual rate of 0·37 per 1,000, which was very slightly below the average; among the twenty-eight towns the measles death-rate was equal to 1·87 in Portsmouth and 2·29 in Oldham. Among the fifty other large towns the highest rates of mortality from measles were 1·89 in Bury and 2·64 in Macclesfield. The death-rate from 'fever' was equal to 0·25 per 1,000, being considerably below the average of the ten preceding corresponding quarters; it averaged 0·26 in the twenty-eight towns, and was highest in Liverpool, Cardiff, and Blackburn. Among the fifty other large towns the fever-rate was highest in Wigan, Chester, and Ystradyfodwg. The fatality of diarrhœal diseases was much below the average. The 1,270 deaths from diphtheria were equal to a rate of 0·19 per 1,000, which very considerably exceeded the average, and was higher than that recorded in any quarter during the past fourteen years. Among the large towns, this disease showed the largest proportional fatality in Leeds, Sunderland, Cardiff, and Hull. Of the 315 fatal cases of smallpox registered in England and Wales during last quarter, 205 occurred in the twenty-eight towns, including 60 in London, 54 in Birmingham, 52 in Sunderland, and 29 in Liverpool.

The causes of 119,607, or 90·5 per cent. of the total deaths in England and Wales last quarter, were certified by registered medical practitioners, and 7,349, or 5·6 per cent., by coroners in inquest cases. The causes of the remaining 5,141, or 3·9 per cent., were not certified. In London the proportion of uncertified deaths did not exceed 1·4 per cent., whereas it averaged 4·5 per cent. in the rest of England and Wales. The proportion of uncertified deaths in the twenty-seven large provincial towns averaged 3·4 per cent., and showed the largest excess in Hull, Wolverhampton, and Halifax.

How would the ladies of the present day like this edict, which in 1770 was solemnly passed and duly registered in France under Louis XV., to be adopted in England? 'Whosoever, by means of red or white paint, perfumes, essences, artificial teeth, false hair, cotton wool, iron corsets, hoops, shoes with high heels, or false hips, shall seek to entice into the bands of marriage any male subject of his Majesty, shall be prosecuted for witchcraft, and declared incapable of matrimony.'

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THE

SANITARY RECORD.

MAY 15, 1884.

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The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

SMALL-POX IN LONDON, AND PUBLIC VACCINATION.

[The following figures have been in type some time, and their immediate interest has perhaps, to a large extent, evaporated. But the results brought out by a detailed and personal inquiry into each of the deaths in a particular year of so-called 'vaccinated' children in London are so striking and suggestive that we think it well, even now, to place them upon record. Moreover, the teachings of the inquiry may be of particular value at the present time, when the metropolis is threatened with another outbreak of small-pox.]

SOME useful reflections may be deduced from a report of Dr. Buchanan to the Local Government Board on the result of some inquiries made under his direction into the relative protective influence of one or another sort of vaccination current in the metropolis. It was evidently important, if only from an administrative point of view, to learn how far the mortality from small-pox amongst the vaccinated, however small its degree, might be attributable to any faults within the system of public vaccination which the Local Government Board is charged to administer. For this reason Dr. Stevens, the chief vaccination inspector for the metropolis, undertook, during the year 1881, an examination of all the small-pox deaths occurring in the houses and hospitals of London, with inquiry (in which he was aided by the vaccination officers) as to all the deaths among people alleged to have been vaccinated or whose vaccination was doubtful; and with more detailed personal inquiry into the cases of people who were said to have been vaccinated by public vaccinators.

The small-pox mortality of the year 1881 is given by Dr. Stevens at 2,379, the deaths including thirty-one in persons brought into London hospitals from beyond the metropolis. Of the 2,348 deaths of Londoners, 1,526 occurred in hospitals, 822 in the homes of the patients; being 65 and 35 per cent. respectively. Of the gross 2,379 persons who died, 678 were taken ill while resident in the union or parish in which they were born; the remaining 1,701 were not so resident at the time of their attack. Out of the 2,579 deaths, children under 15 numbered 1,125, or not quite half the total number; children under 10 numbered 953; under 5, 607.

Formerly 'in the twenty years before 1871, when public vaccination was gratuitously provided, but when compulsion was little more than nominal, more than half the deaths from small-pox that occurred in London were of children under their fifth year. In the ten years, 1851-60, these children contributed 59·5 per cent. to the all-age small-pox mortality of the metropolis, and in 1861-70 they contributed 54·3 per cent. In the year 1881 (when not quite half the deaths were contributed by children under 15), children under 5 contributed only 27·8 deaths to every 100 deaths from small-pox in the metropolis. These figures show that it is especially to the advantage of children that vaccination has been made compulsory. For in the year 1881 the unvaccinated suffered from small-pox immensely in excess of the vaccinated; the difference between the two classes, observable at every age, being most observable at younger ages. Considering especially the small-pox mortality among children under 10 in the vaccinated compared with the unvaccinated, Dr. Buchanan observes that in 1881 the small-pox deaths of London among children under this age were—(*a*) 782 deaths among the 55,000 who had not been vaccinated; (*b*) 125 deaths among the 861,000 who had been vaccinated. Upon equal numbers of the two classes, therefore, the mortality from small-pox among the unvaccinated was about a hundredfold the mortality from small-pox among the vaccinated. This degree of protection was given to children under ten by the average current vaccination of London.

London vaccination, however, has to be considered as being of divers sorts, and Dr. Stevens's inquiries have taken account of these. The 125 children under ten who died of small-pox after an alleged vaccination have to be reduced to 117 by deduction of those who were discovered on his personal inquiry not to have been vaccinated at all, or to have been 'unsuccessfully' vaccinated; and this number 117 divides into 82 vaccinated by private practitioners, and 35 vaccinated by public vaccinators. Of these latter it turned out upon inquiry that 12 had never been vaccinated until after they had been exposed to small-pox infection, when it was too late to protect them against catching the disease and too late to modify its virulence. There remained 23 instances, and only 23, in which the question arose—'Why did public vaccination fail to protect from death by small-pox during the first ten years of life?' Dr. Stevens's notes enable a reply to be given to this question in the case of a good many of the children, and they show to what small dimensions the failure of public vaccination has dwindled. The record of small-pox deaths among children under ten vaccinated by public vaccinators proves to be made up—(*a*) of two cases that could not be traced, and in almost equal numbers by (*b*) cases where the child was ill of some independent disease before the occurrence of what was registered as small-pox (in a few it is doubtful whether small-pox was present at all), and (*c*) cases carrying scanty and imperfect marks on their arms though done by the public vaccinator. There was one child, and only one, of whom it could be said that vaccination had apparently been performed in the manner contemplated by the instructions, and yet had died of small-pox contracted while it was in its usual health. That there should be a stray case of the last kind is no wonder. Such cases find their parallel in those occasional instances where small-pox itself attacks a person even severely, and yet leaves him liable to death from a second attack of the same disease after a few years' interval. We may ascribe, therefore, a part of the 35 deaths—but only a small part of this very small number—to unsatisfactory quality of vaccination, as done in some instances by public vaccinators. But the very great bulk of the vaccinations performed by public vaccinators have been protective against death by small-pox during the recent epidemic, and the creditable account

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which Dr. Stevens brings from inspection of their actual work is endorsed by the evidence of the death returns.

Discussing the extent to which London children have profited by vaccination during the recent epidemic of small-pox, Dr. Buchanan observes that in 1881 among the 55,000 children who had not been vaccinated, there were 782 deaths from small-pox; among the 861,000 children who had been vaccinated, that there were 125 deaths from small-pox.

If the London children under 10 who were unvaccinated had had the protection which the current vaccination gives, not 782 of them, but at the outside *nine*, would have died of small-pox during the year. If the 861,000 vaccinated children had died at the rate of the 55,000 unvaccinated, we should be confronted with an additional 12,000 and more deaths from small-pox. occurring during the year in the London population under 10 years of age.

This saving of life was essentially the effect of vaccination. The children under 10 living in London and having been vaccinated at the public expense number about 430,000. If the rate of death which prevailed among the unvaccinated children of London had prevailed also among this section of the vaccinated, then, among these vaccinated children there would have been more than 6,000 deaths from small-pox in 1881. But out of these children, being in chief part children of poorer class, what was the number of deaths that actually did occur from small-pox? Not six thousand, nor one thousand, but at the outside thirty-five; more truly twenty-three, for twelve of them were not vaccinated till small-pox had actually taken hold on their bodies. In spite, therefore, of any greater exposure to small-pox undergone by the poorer half of the vaccinated community, the poorer half had actually less mortality from small-pox among its children than the richer half; and the allegation that the escape of the vaccinated from death by small-pox was due to any smaller risk of small-pox infection encountered by the vaccinated as compared with the unvaccinated may be confidently set aside.

It is not to be disputed that this saving of life by vaccination is in great measure due to the operation of the Vaccination Acts of 1867 and 1871. The same operation of these Acts is manifested in the change in the age of people who die from small-pox in London. In the two periods of ten years immediately preceding 1871, 59 and 54 per cent., more than half, of the total small-pox mortality was borne by children under five years old: now only 28 per cent., little more than a quarter, of the total small-pox mortality falls upon such children.

In London, in 1881, twelve deaths were registered as from 'cow-pox' and disease occurring after vaccination. Inquiry into the facts of the several deaths showed that the cause of death was, with hardly an exception, erysipelas: derived from one or other source and seldom even dating from the vaccination. But even supposing all the twelve deaths had been justly attributable to vaccination, and had been unavoidable results of vaccination, then twelve lives lost by vaccination have paid for the gain of 12,000 children's lives that would, but for vaccination, have been sacrificed to small-pox. not to mention any gain of security after childhood, afforded by vaccination in infancy. The price has not, in truth, been so high as this; but the complete abolition of every such drawback to vaccination is the aim of everyone who appreciates the value of the operation.

WATER RATES.

THE question of water rates seems to excite more interest than ever. In the metropolis an association has been formed for the purpose of protecting the interest of the ratepayers, and exacting from the companies the benefit of the decision of the House of Lords in Dobbs's case. Cases are frequently reported in the newspapers in which individual consumers have revolted against the assessment put upon their premises by the water companies, and have appeared before justices for the purpose of getting their assessments reduced. In most of these cases, though not in all, the ratepayers have been successful; and at the expenditure of a good deal of time and trouble, to say nothing of money actually paid for the purpose of procuring legal assistance and the necessary evidence, have reduced their water bill by a few shillings. This does not satisfy them; and many consumers are now demanding, in assumed conformity with the decision in Dobbs's case, that the companies should everywhere make out their bills according to the rateable value of the premises supplied, as shown by the poor law valuation. The companies profess obedience to the judgment of the House of Lords, but do not seem in any hurry to adopt the rate-book as their standard. Technically they are justified in the course they adopt. Dobbs's case does not decide that the valuation lists, as made out by the assessment committees, are binding on the water companies; but only that water rates are to be charged on the 'annual value,' which, according to what must now be accepted as settled law, is to be calculated in the same manner as 'rateable value' must be calculated for the purposes of poor law valuation; but the calculation need not necessarily be made by the same persons. The water companies are not at present bound to accept the valuation of the Poor Law Assessment Committee as final, but are at liberty to make a valuation for themselves, and in case of dispute to have the value of the premises determined by a stipendiary magistrate or two justices. Mr. Torrens proposes to alter this, and has brought in a Bill to compel the water companies to levy their water rates on the same annual value as that on which the poor rate is charged. The wording of this Bill is rather indefinite, and must be made clearer if it is to prove workable; but the principle is intelligible enough. Whether the change ought to be made is another matter. In the Metropolis the alteration might prove fair enough, as the Metropolis Valuation Act—by its machinery for revising the different local assessments, and by providing for a quinquennial re-valuation of the whole metropolitan area—secures that the valuation of property in different parts of the metropolis shall be fairly accurate and fairly equal. Even then the water companies might complain of the change, on the ground that it might expose them to have the valuation unduly lowered without giving them an opportunity of objecting; and if Mr. Torrens's Bill is to become law we think the water companies ought to have a right to appeal against any assessment given to them *specifically* as parties aggrieved. With this proviso the principle of the Bill seems right, and we believe

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that it might work satisfactorily and save much vexation and litigation within the limits to which the Metropolis Valuation Act is applicable.

But outside that area the case is different. Water companies and corporations are entitled throughout the country to charge for water in proportion to the annual value of the premises supplied. Whether this 'annual value' is in all cases the rateable value, as decided in Dobbs's case, seems more than doubtful. And one case has come under our notice—viz., that of Doncaster—in which it seems that under the express words of the local Act there in force, the Corporation are entitled to charge upon the gross value. It must not be forgotten that most water companies have their private Acts of Parliament, and that many of these Acts authorise the company to charge in ways different from that provided by the Waterworks Clauses Act, 1847. A general Act which obliged them to charge on rateable value might in many cases deprive the companies of rights which they possess at present under the sanction of Parliament, and which are valuable. Besides this, it cannot be said that the poor law valuation outside the metropolis is by any means uniformly accurate at the present time. The Union Assessment Act is supposed to have secured that valuations within the area of a union shall be fairly equal. It is doubtful whether even this has been secured; but the difference of value now assigned to property of the same class in different unions is notorious. It is not too much to say that, if they saw their way to reducing their water bills, some unions might not improbably lower their valuations considerably. The water companies have a fair right to object to have their Parliamentary charges placed at the mercy of local committees, or to be bound as to the value of premises by what appears in the ratebook. Our sympathies are with Mr. Dobbs and those who have to pay water rates; but we cannot shut our eyes to the possibility of confiscation and unfairness in the proposed changes, and we fear that Mr. Torrens's Bill, if not carefully watched, may have the effect of leaving things in a state that will be found even more unsatisfactory than the one in which they are at present.

THE LONDON GOVERNMENT BILL.

EXCEPT when the rate-collector comes round or his dust-bin becomes offensive, the average Londoner knows little, and cares less, about the local government of the particular district in which he happens to reside. London itself is so huge that interest in municipal affairs has become so attenuated as to have practically disappeared, except in the minds of a very small and uninfluential portion of the community. It is too much to expect, therefore, that any very demonstrative feeling should be manifested with regard to the Home Secretary's London Government Bill, either one way or the other, except by those who now wield the power and wish to keep it. The votes of wardmotes in the City, carefully advertised in the daily papers, really go for nothing as representing the general feeling of the metropolis on the subject, and it could hardly be anticipated that either the Corporation or the Vestries would show much alacrity to assist in their own dissolution. The struggle for existence of the powers that be, on the one hand, and the indifference of the governed on the other, tend to obscure the real point at issue, which is of course the local government of the metropolis in the best, most economical, and most efficient way.

That these desiderata are fulfilled at present few people will be disposed to maintain. It would serve no useful purpose to gird at the incapacity, shortsightedness, and lack of concord on the part of the thirty-nine vestries and district boards who now rule over the metropolis. Admittedly some sort of uniformity in the local government of areas closely connected with each other, but now divided by arbitrary parish boundaries, is required. The scheme of separate municipalities for divisions of London would no doubt be found impracticable, since the various districts are so interwoven that it would be impossible to dissociate their interests. The only practical way of dealing with the subject is to have one central council made up of representatives directly elected by the inhabitants of each locality, which shall administer for the common good all matters in which the metropolis at large has a common concern. It would be idle to expect that any such council, however industrious or well-meaning, could efficiently supervise all the details of the sanitary government of 4,000,000 of people scattered over an area of 122 square miles. Obviously the more local duty of regulation must be delegated to some other authority in relation with, but to a certain extent independent of, the central authority. Whether these district councils should possess powers of action of their own motion, or should merely act as local committees of the central board, is a very debateable point, and one which needs much grave consideration; but that there should be an authority with powers of controlling, and the will to exercise that power, is obviously essential to secure uniformity and to prevent needless waste.

The Home Secretary's Bill for the better government of London deals with these complicated problems in a manner which on the whole must be regarded as satisfactory and just. Probably not even the most advanced socialist would desire that the ancient Corporation, with its glorious traditions, should be absolutely swept away in favour of a brand-new council, with no history to boast of. The Metropolitan Board of Works has admittedly performed some very useful functions, but it suffers by not being directly elected by the ratepayers. The proposal to transfer bodily the whole of the members of that Board to the new council may be taken as an indication of the appreciation by the Government of the worth and business capacity of the Board.

The City Corporation, imbued with the idea that the City was created for them, and not they for the City, have determined to fight the Bill—in the words of the Lord Mayor—'line by line.' The Metropolitan Board of Works have been more reasonable. They agree in the necessity of one central municipal government having jurisdiction for the whole metropolis, but they think that the existing local government, by vestries or some similar bodies, should be continued, though in a revised and readjusted shape. It must be confessed that there is much to be said for the views of the Metropolitan Board. If the local authorities are to be mere committees of the central council, with no independent powers of their own, delays, friction, and recrimination will be sure to ensue. On the other hand, it may be argued that, to leave local authorities as they are, merely placing the nominal control in the hands of the central body, will be to provoke a struggle for supremacy between the two. The remedy will

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probably be found in the complete readjustment and multiplication of the existing local districts, which have been formed on no sort of plan, and which present every diversity of area, population, and density. Sir William Harcourt, with the praiseworthy object of keeping his Bill as free from debateable matter as possible, leaves all questions of readjustment and redistribution of area to be settled by the new central council which he proposes to create.

Indeed, the principle of the Bill may be stated in a few words. It creates a new central council of 240 members to be built on the foundations of the old Corporation. On this council, in the first instance, a certain number of the members of the present Common Council, and all the members of the Metropolitan Board of Works are to be appointed, the balance of the 240 members being elected by the ratepayers of the existing sanitary districts in proportion to their area and population. Later, the whole of the 240 are to be directly elected by the ratepayers. To this central council will be transferred all the powers and duties of the City Corporation, the Metropolitan Board of Works, the vestries, and other local authorities now ruling in the metropolis. The district councils, which are to be elected in the same way and at the same time as the central council, will supervise local matters, but will have no power of doing more than is delegated to them by the latter. The exact duties to be performed by the district councils are to be settled by the central council when it has got to work. The Lord Mayor is to be continued with apparently undiminished grandeur; but there will be no more aldermen and only one sheriff. London is to be made a separate county by itself. The other parts of the Bill are more or less detail, and do not affect the main point.

So large a measure of reform will necessarily meet with a good deal of opposition from a variety of quarters, and this opposition, even if not serious in itself, will no doubt prove collectively a considerable drag to the progress of the Bill. We are not without hope, however, that its main principle will be found to approve itself to a clear majority of the House of Commons, as it has already commended itself to all those who study its provisions from a higher point of view than a mere parochial one. That London should so long have been municipally disorganised is a very remarkable and somewhat shameful fact. As Lord John Russell once remarked, 'There is no reason why municipal reform should stop short at Temple Bar.' It is idle to argue that the present system is either satisfactory or creditable. The composition of the vestries has, except in a few districts where public opinion has recently quickened, steadily retrograded. The new central council may be fairly expected to attract men of a distinctly higher mental calibre than those who now compose the Corporation and the Vestries; and gradually the whole tone of municipal life will thus be raised. Economy with efficiency is the one cardinal point to be aimed at. Nothing can well be worse than our present system, and an honest attempt to raise London to the level of other great cities in the character of its local government merits therefore the approval and cordial approbation of every thoughtful citizen.

SCARLET FEVER forms 75 per cent. of the cases of zymotic disease reported to the medical officer of health for Newcastle.

NOTES OF THE MONTH.

OVER-PRESSURE IN SCHOOLS.

WITH the exception of the housing of the poor, no question has of late received so much public attention as that of over-pressure in schools. Referring to the subject in a recent report on the Middlesex and Hertfordshire combined district, Dr. Saunders observes that quite recently he had occasion to visit a new and splendidly built Board school, when the schoolmistress begged him to see if he could find out any sanitary defect, as there was scarcely an afternoon that children did not complain of 'faintness,' and had to sit out in the adjoining lobby. There was no overcrowding of the schoolroom, nor any sanitary defect in the building; the 'faintness' being due, in Dr. Saunders's opinion, to an overstrained nervous system in badly-nurtured, ill-clothed, and housed bodies, which, under more favourable external circumstances, would not have been felt. He thinks that unless improvements are made in the environments of such children, mental fatigue will be felt more and more as the school requirements increase. Mr. James Allen, of Bollington, reports that several instances of the injurious effects upon the minds and bodies of children, arising from over-pressure, have come under his observation. Such cases were chiefly found where the homes were wretched and poor, and the food insufficient and unwholesome. Mr. Karkeek's suggestion in the SANITARY RECORD of April 15 tha elementary hygiene should be taught in Board schoo is deserving of every support.

FISH FRYING.

THE discussion which took place at a recent meeting of the Society of Medical Officers of Health (*see* SANITARY RECORD, April 1884, p. 503) as to whether the business of a bone and rag merchant should not be classed as an offensive one within the meaning of section 112 of the Public Health Act, 1875, has, at least, been successful in drawing public attention to the subject. Dr. Orme Dudfield made out a good case in support of his view that such a trade might usefully be brought under the control of by-laws, though the Metropolitan Board of Works have failed to see the question in the same light. Another point in connection with the constitution of an offensive trade has recently been decided by the Court of Queen's Bench. The Braintree Local Board entered an action against a person for unlawfully carrying on a noxious and offensive trade—that of frying fish for sale—without their written consent. The local justices convicted. (See SANITARY RECORD, Jan. 15, 1884, page 372.) On appeal the quarter sessions held that the business was offensive, the effluvia being experienced at a distance of 250 yards, but that it was not a trade prohibited by sect. 112 of the Public Health Act. This decision has now been upheld by the Court of Queen's Bench. We are glad to note this decision. Fish cooked by frying is one of the most nutritious and wholesome of foods, the addition of the fatty medium used for frying being the only element needed to make the fish a first-class article of diet. It is also the most savoury method of preparing fish in a rough and ready fashion. Although the odour of fish-frying may not be altogether agreeable to persons of refined habits of life and fastidious ways of thinking, there is

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nothing strictly offensive in it, nor can we see how by the light of common sense it can be construed into a nuisance. Fried fish is already very largely consumed by the indigent classes of the community, and should be more so. It would therefore have been much to be deplored had the decision of the local justices of Braintree been confirmed by the higher court. The food resources of the English people are by no means too plentiful or too varied.

MORTUARY REGULATIONS.

IN his last monthly report on the health of Kensington, Dr. Orme Dudfield refers to the number of applications that have been made to him by undertakers for permission to remove bodies from the mortuary to be deposited on the private premises of the said undertakers, there to await burial. All applicants for permission to deposit a body in the mortuary are required to abide by the vestry's rules for the regulation of the mortuary. The third rule is to the effect that 'no body shall be removed from the mortuary, except for burial, without the permission of the medical officer of health, and then only on condition that it shall have been first enclosed to the satisfaction of the medical officer of health.' Hitherto, Dr. Dudfield has felt it his duty to refuse application for permission to remove a body except for burial, and has thereby given offence. In view of this, he asks whether applications from undertakers are in future to be acceded to, and likewise whether he is to accede to applications for permission to remove bodies to private houses irrespective of the sufficiency, or otherwise, of the accommodation provided for the safe keeping of the body whilst awaiting burial. With regard to undertakers, but few of them possess suitable mortuary accommodation, and Dr. Dudfield is informed that not unusually bodies thus removed are, for the convenience of relatives, kept in a hearse or deposited in a coach-house. The vestry will doubtless experience little difficulty in answering Dr. Dudfield's application for instruction. The fact that, in the majority of cases, bodies are removed to the mortuary for lack of proper accommodation outside, is quite sufficient to warrant a refusal to applications for removal to private houses, unless the sanitary officials are assured that regard will be had to the safe keeping of the dead previous to interment. The question of removal by undertakers presents a somewhat different aspect, but it seems to us that the ends for which the mortuary was erected are more likely to be attained by the retention of the bodies in the building, than by their removal to the questionable accommodation afforded by many of the London undertakers.

THE HIGH MORTALITY OF PRESTON.

A DEPUTATION from the Friendly Society and Trades Unions of Preston, representing at least 50,000 of the inhabitants, has presented a memorial to the Town Council respecting the mortality in the borough. They say the high death-rate does not arise from bad drainage, or from an unhealthy position, as Preston is dry and elevated, being open to both sea and land breezes, the water supply is admirable, food cheap, good, and abundant. The memorialists are agreed that 'the root of the mischief has been the inadequate building by-laws in force in Preston in times past, the want of thoroughness in enforcing sanitary regulations even now, and the insufficiency and inefficiency of the staff of sanitary officers.' They 'have reason to know that in the houses inhabited by the working classes of Preston all the evils of what is known as jerry building and sanitary botchwork are abundantly exemplified; the very situation of many middens is unspeakably vile, necessitating their being emptied through ordinary living apartments, and so inviting contagion and disease. The use of ashes, mixed with house refuse, for making false foundations is frequent; the stench from noisome manufactories is sickening; the effluvium from the gas-works is noxious and debilitating; and the sanitary inspectors employed are not equal to the work expected from them.' In conclusion, the memorialists 'suggest the advisability of instituting some such stringent official inquiry into the character of artisans' dwellings in Preston as is now being prosecuted in Birmingham by the Corporation of that town.' The memorial was referred to the Sanitary Committee.

BLOOD-POISONING FROM A DISEASED PIG.

AN inquest has been held at Walton Infirmary, Cheshire, on the body of George Peacock, a well-known pig-butcher in the district, who died from blood-poisoning under the following circumstances. A pig belonging to a farmer in the neighbourhood died from splenic apoplexy, and the deceased cut the animal open. During this operation the disease was communicated to him by means of a scratch in the arm, and he died after three days' illness. A verdict in accordance with these facts was returned.

MILK ADULTERATION AT BIRMINGHAM.

IN the SANITARY RECORD for March last (p. 450) we had occasion to animadvert on the slow progress which was being made at Birmingham in bringing milk adulterators to justice. A new chief inspector of nuisances appears to have been since appointed, and under his guidance much more activity is being manifested with reference to adulteration. In the quarter ended March 31 last eighty-five samples of milk were submitted for analysis by the inspector, forty-two of which were found to be adulterated, and have been dealt with in a summary manner. On one day last month fines were imposed on twelve different milk-sellers for retailing watered milk, and on four others for selling adulterated butter. The proportion of adulterants was in several of the cases extremely large, and we think that heavier fines might with advantage be imposed upon these pilfering shopkeepers.

SMALL-POX AND INFECTED RAGS.

SOME dropping cases of small-pox have been occurring at Ugborough, in the Totnes Rural Sanitary District, which appear to have been clearly due to infection caught from rags at a local paper-mill. There have already been four cases in the village, three of which were mill-hands. The fourth, a brother-in-law of one of the patients, is thought to have caught the infection at the funeral. No steps appear to have been taken by the millowners to prevent further cases of the kind; and the authority have contented themselves with an appeal to the owners to 'take all necessary steps in the matter.' Surely this is very unsatisfactory. Active measures should at once be taken by the authority themselves

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to insist upon the proper disinfection of the suspected rags, and, if need be, their destruction. There have not been wanting instances of serious epidemics arising through carelessness in the manipulation of infected rags; and no further time should be lost in taking the necessary precautionary measures.

THE SANITARY CONDITION OF WATERING-PLACES.

THE time is rapidly approaching when the authorities of various health resorts will be busy setting out the lowness of their death-rates and the absence of any zymotic disorders in the district, in the hope of securing increased patronage. But a low rate of mortality is not the only thing to be looked at, and it is of primary importance that the general sanitary circumstances of these places should be beyond suspicion. A recent report by Dr. Blaxall shows that this is far from being the case at Burnham, a small watering-place in Somersetshire. The chief want of the town is a supply of good drinking water, and it was in consequence of the numerous complaints on this subject, and the absence of satisfactory information from the local authority, that led to Dr. Blaxall's inquiry. He found that the supply is at present obtained from wells which are very numerous, water being obtainable at almost any spot. These wells, which are sunk through the sand on to, and sometimes a short distance into, the clay, are, from the geological nature of the district, mere catch-basins, the impermeable clay serving to hold up the water that drains into them from the surrounding sandy soil. The immediate manner in which the wells are acted on by surface water was instanced on the occasion of the recent flooding of the town by sea water, the wells on the following morning being so impregnated with salt that the water was not drinkable, and this condition obtained for some days and even weeks subsequently During recent years samples of water from several of the wells in the town have been analysed by various chemists, with the result that out of twenty-three samples examined, in not a single instance is unqualified approval given of the water for drinking, while many are totally condemned, and one is characterised as only fit for 'irrigation purposes.' In another instance Dr. Blaxall was told by the health officer that the water obtained from this same well when kept boiling gave off steam pungent with ammonia. In other respects the condition of the place is far from satisfactory. The sewers are unflushed and imperfectly ventilated. The house drains, like the sewers, are mostly composed of glazed pipes, with joints of clay. They are unventilated, and the waste-water pipes from baths, sinks, and lavatories in the interior of lodging-houses and other dwellings are very generally in direct communication with the drains. In summarising the results of his investigation Dr. Blaxall pertinently observes, 'the inhabitants of Burnham, it must be remembered, are not alone concerned in the sanitary condition of their town. The public who frequent this watering-place have a direct interest in it, and it is only right that they should, so far as is practicable, be assured that in such visits they are not exposing themselves to the risk of contracting preventable diseases through the atmosphere of their dwellings being poisoned by sewer-air and the water they drink being dangerously contaminated, a guarantee which Burnham at the present time cannot afford them.' It is a sign of the times that the public are beginning to discriminate between that which is right and that which is wrong in the condition of health resorts, and it therefore behoves the local authority of Burnham to use every effort to improve the state of things which exists in their midst.

THE TOTTENHAM SANITARY ASSOCIATION.

THE recent considerable increase in the number of local sanitary associations to watch over the public health of districts and the doings of the local authorities, is a satisfactory sign of the increased interest which the public are beginning to exhibit in sanitary matters. With proper management such associations are capable of doing much good work, and more than one health official has spoken in eulogistic terms of the benefit that has arisen from their formation. The tenth report of the Tottenham Sanitary Association is not so complete as its predecessors, and too much of the text is occupied with statistical statements. The population of the district is estimated at 62,418 persons, and the death-rate at 16·14 per 1,000, which, with the exception of 1877, is the lowest recorded since 1871. This rate, however, is above that recorded in twelve suburban areas by ·82, a difference representing fifty deaths. There was a marked diminution in the mortality from zymotic disease, which fell from 4·01 per 1,000 in 1882, to 2·71 in 1883. Referring to this, the report states: 'An improvement so conspicuous induces the committee to hope that this diminution is the result of the increased control over those causes which produce and aggravate this class of maladies, but still the average fatality of this form of disease is much above the average of the twelve suburban districts, so that much vigilance and investigation are still required on the part of the local authorities.' Nothing is said in the report as to the ventilation of the sewers, or as to the provision of swimming-baths, both of which were referred to in the previous report; but the water supply is reported as maintaining its character for comparative purity. Situated as it is, there is no reason why Tottenham, with efficient sanitary administration, should not rank high as a healthy locality, and the figures for 1883 may perhaps be taken as indicating that a change for the better has commenced.

THE FLESH AND MILK OF TUBERCULOUS ANIMALS.

IN the *Revue d'Hygiène et de Police Sanitaire* Dr. E. Vallin discusses the question of the injuriousness or otherwise of the flesh and milk of tuberculous animals. The great question to be decided, he says, is whether it be necessary to prohibit the sale of flesh from animals affected in any degree whatsoever. Clinical observation shows that tuberculous lesions may remain local, and that amputation of a foot or hand, the seat of tuberculous caries, may effectually check the disease. It would seem that the bacillus only circulates in the blood when the lesion is very extensive, and then phthisis (properly so-called) is produced. If this be so—of course, at present it is only a hypothesis—the conclusions which M. Lydtin (principal veterinary surgeon of the Duchy of Baden) submitted to the Congress of Brussels, in 1883, may be adopted with safety. M. Lydtin's conclusions are: 1. That the flesh and viscera of tuberculous animals may be used as food, provided the disease is only commencing, the lesions extending but to a

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small part of the body, the lymphatic glands being still healthy, provided the tubercle centres have not undergone softening, and provided the carcase is well nourished and the flesh presents the characters of meat of the first quality. 2. That the flesh of animals showing very pronounced tuberculous infection should be saturated with petroleum and afterwards buried under the direction of the police. 3. That the milk from cows affected with pulmonary phthisis, or suspected of having it, should not be consumed by man or certain animals, and the sale of it should be strictly prohibited. M. Lydtin added that as for the milk of suspected animals, it might be permitted to be used as food after being boiled. Restrictions based on such conclusions may appear insufficient to those who have been taught by experience the virulence of tuberculosis. It was, however, difficult to ask for more at the time of the Congress. M. Bouley, who was favourable to the condemning and disinfecting (dénaturation) of all flesh from tuberculous animals, thought it might be possible to indemnify the owners of oxen *in apparently good condition*—oxen only recognised as tuberculous after killing. M. Bouley's proposal was not accepted by the Congress. If slightly affected animals are really injurious, very extraordinary precautions should be taken to obtain efficient inspection at the place of slaughter, for when the lungs are badly diseased the flesh may present a most attractive appearance. Indeed, it is known that beasts commended by the judges at cattle shows have been found tuberculous. M. Vallin concludes that the whole question is a most difficult one, and in solving it we must consider what is fair to the trade as well as what is required in the interests of public health. On M. Vallin's suggestion the subject is to be taken up this year at the International Congress of Hygiene at the Hague.

THE SANITARY CONDITION OF BIRMINGHAM WORKSHOPS.

THE Sub-Inspector of Factories, Mr. Bowling, who until recently had charge of the Birmingham district, refers in his annual report to the great steps which have been taken during the last few years in the town to improve the conditions under which its thousands of toiling people perform their daily round of work. In 1872, in the course of his report, he found it necessary to say that the wretched condition of the Birmingham factories and workshops went a long way to account for the deplorable moral and physical condition of a large number of both the old and young persons employed in them. 'There are,' he stated, 'many such places in Birmingham which are a disgrace to a civilised country. Low, dirty, and dark, cramped up in back courts, half-a-dozen cottages, perhaps, converted into a factory, or, I might more properly say, a kind of human warren, in and out of the intricacies of which you see men, women, and children burrowing their way to their appointed holes. Such words,' he now says, 'fitly described a large number of Birmingham factories and workshops in 1872, and though great improvements in this respect have taken place in the last ten years there still remain too many places which should be improved off the face of the earth.' Two-thirds of the waking life of a working man, he adds, are spent in the factory or workshop, and it is not easy to exaggerate the influence for good or for evil that the conditions under which he exercises his handicraft exert over his private life. When the factory is well-ordered, healthy, and cheerful, the workpeople are the same; when it is neglected, dirty, and ill-arranged, the workpeople are almost sure to be impregnated by the influence, and to carry it to their homes. In every way, he says, much has been done to make life more attractive, and slow but steady improvement is taking place both in the workshops and in the dwellings. He also suggests that if a company were formed for the erection of model workshops, which could be let out to the thousands of small masters who now carry on their handicrafts under very wretched and unsanitary conditions, and in hopelessly miserable places, which must have a very depressing and demoralising influence on the people who have to work in them, such an enterprise, besides resulting in vast benefit to the community, would be a commercial success.

AN AUSTRALIAN PLAGUE.

MOST of our readers have heard of the plague of wild rabbits in Australia and Mr. Willow's proposal to thin them out by communicating to them tuberculosis. The plan has been officially reported upon, and is said to have proved successful on a small scale, and the subject is naturally exciting considerable attention in our Australian colonies. We have been favoured with a recent issue of a Brisbane newspaper, in which the scheme is reviewed with care and intelligence. The writer justly remarks that the important questions which must be answered in the negative before Mr. Willows can be allowed to carry out his plan are: 1. Can consumption be communicated by rabbits, dead or alive, to animals other than rabbits? 2. Can consumption be communicated by animals alive, or as used for food, to man? After a careful *résumé* of the evidence available for the solution of these questions, the very sound conclusion is arrived at that we are certainly not in a position to answer either question negatively, and that 'broadcasting the bacillus of tubercle over the pastoral country of Australia' would be a most hazardous experiment. By way of emphasising the importance of giving human beings and stock a healthy environment, attention is drawn to the fact that it is the susceptibility to consumption rather than the disease itself which is inherited. The article is throughout so excellent and cautious that we are surprised at the statement, near the end, 'sheep are not susceptible to consumption.' It may be that this represents the experience of Queensland farmers; it is certainly not true as regards sheep in this quarter of the globe.

TEN YEARS' SANITARY WORK.

WE observe with satisfaction that a not inconsiderable number of medical officers of health are taking advantage of the completion of their first decade of office to make a retrospect of the last ten years from the point of view of the influence of sanitary measures on the public health. If this good example were generally followed, some highly important general conclusions for future guidance might be arrived at. The country will expect to be satisfied that a sufficient recompense for the many millions of money that have been spent on sanitary

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works since the passing of the Public Health Act has been found in the diminution of the national mortality from preventable causes. The results declared by individual medical officers of health are, of course, too isolated and fragmentary to warrant any general deductions being drawn from them. It is necessary for the proper understanding of the matter that a complete and systematic study of sanitary improvements and the decrease of death-rates should be made by a Department of State, which alone has the means at hand for such a purpose. The subject might well engage the attention of the Local Government Board in their next report, or the Registrar-General in his forthcoming decennial summary. Meanwhile, we give beneath two typical instances, in a well-ordered urban and rural sanitary district, of the results obtained by ten years of work.

Dr. Seaton, of Nottingham, writes a report, eighty pages long, descriptive of the sanitary improvement of that borough since 1872, and its effect upon the death-rate. This report shows the multifarious character of the duties of a Health Department, and the necessity for keeping all branches of the work abreast of one another; but it is too complicated to quote. The outcome of it is that the average death-rate has been reduced from 24 to 22·6, so that in the last ten years there has been a saving of fourteen lives for each ten thousand of the population, and this, it must be remembered, whilst the town was growing at an enormous rate. This reduction of the death-rate is most conspicuous at the age periods which embrace youth, manhood, and womanhood. Dr. Seaton omits to give us any tables or facts showing the diminution of the mortality from preventable causes, and apparently contents himself with the decrease in the mortality as a whole. Of course those who are saved from death by zymotic disease must eventually die from some cause or other, and the mere displacement of mortality is not so important as its absolute reduction. But the report might profitably have contained some figures about zymotic mortality, as showing the effect of sanitary measures on the special class of diseases against which they are directed.

Mr. G. E. Hyde's report on ten years' work in the Martley rural sanitary district is less elaborate but equally useful. During the ten years 1874–83 the death-rate represented 15·81 per 1,000 amongst a mean population of 16,348 persons, while during the ten years 1861–70 it stood at 17·19 per 1,000, when the mean population was 15,703. There was a marked decrease in the mortality from typhoid, a decrease essentially associated with insanitary surroundings, the fatal cases being 27 as against 91, a saving of 64 lives. From zymotic disorders the deaths in the first period numbered 426, and in the second 235. Diphtheria, diarrhœa, and scarlet fever each exhibited a very considerable decline. During the last ten years the district has been provided with a complete system of sewerage, the water supply has been improved, and by-laws, having for their object the regulation of new streets and buildings, the removal of refuse, &c., have been adopted.

THE LATE DR. ANGUS SMITH.

IT is with extreme regret that we have to announce the death of Dr. Robert Angus Smith, F.R.S., F.C.S., Ph.D., of Manchester, which occurred on May 13, at Glyn Wood, Colwyn Bay, where he had gone for the benefit of his health. Dr. Smith was born near Glasgow, Feb. 15, 1817, was educated at Glasgow, and studied chemistry at Giessen, under Liebig, from 1839 till 1841. A report which he presented to the British Association in 1848 on the air and water of towns gave a great impulse to the question at that time, and a paper on the air of towns in the *Chemical Society's Journal* of 1858, first produced data establishing the difference of the town and country air wherever found. He was elected F.R.S. in 1857, and was some time president of the Literary and Philosophical Society of Manchester. His special inquiries into the quality of the air of towns when polluted by gases from manufactures led to his appointment by the Board of Trade under the Alkali Act of 1873 as inspector-general of alkali works for the United Kingdom. The honorary degree of LL.D. was conferred upon him by the University of Edinburgh in 1882. He wrote, among other works, a 'Life of Dalton, and History of the Atomic Theory up to his Time,' 'Air and Rain; the beginning of a Chemical Climatology,' 'Science in Early Manchester,' Official Reports to the Board of Health and to the Royal Society on the Absorption of Gases, various memoirs on the Arts in Ure and Hunt's 'New Dictionary of Arts and Sciences'; by desire of the Royal Cattle Plague Commission, a memoir on the action of disinfectants generally, and several archæological papers on Scottish and Icelandic subjects. One of the last papers written by Dr. Angus Smith, 'On the Development of Living Germs in Water by Koch's Process,' was kindly revised by him for the SANITARY RECORD, in which it was published in vol. xiv. p. 344.

His address on 'Air as a Sanitary Agent,' delivered at the Congress of the Sanitary Institute, Oct. 15, 1883. By the lamented death of Dr. Angus Smith this journal loses a valued contributor and unswerving friend, whose scientific attainments were equalled by his unfailing courtesy and kindness.

THE DWELLING HOUSES INSPECTION BILL.

THE Standing Committee on Health of the Social Science Association, at a recent meeting, Sir Richard Temple, Bart., in the chair, considered the provisions of the 'Dwelling Houses Inspection Bill.' A resolution was unanimously passed regretting that as its clauses were of such an impracticable and unjust character, the committee were unable to give the measure their support.

AMERICAN BUTTER AND MILK.

NEW YORK mail advices throw further light on the report of the committee of the Senate as to the 'Bogus Butter Industry' practised in some of the States. As reported in the SANITARY RECORD of April 15, p. 499, the committee affirm that they have discovered wholesale and alarming adulterations, dangerous to the consumer and depreciating property in the rural districts. The adulteration of butter by tallow oil, bone oil, and lard oil was found in almost every town and city in the State of New York, and in amount equal to one-half the production of natural butter. The imitation has been so disguised as to be often only discernible by chemical analysis. Out of thirty samples of butter purchased

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by the committee in New York, only ten were genuine. No labels to distinguish the pure from the bogus butter are displayed, as required by existing law. The bogus butter is largely purchased by saloons, boarding-houses, and second-class hotels. The poorer quality of bogus butter sells for 20 cents to 30 cents. to labouring men, and the better grades 40 cents. to 45 cents. The cost to the manufacturer ranges from 12 cents to 18 cents ; average 14 cents. Several New York and Brooklyn concerns manufacture over 3,000,000 lbs., each of fats brought from the West and from France and Italy. The bulk of the bogus butter is manufactured in the West and sold in New York, to the detriment of the State's dairy interests. Many dairy farmers have been driven out of the business. The consequent loss to the State is estimated at from 5,000,000 dols. to 10,000,000 dols. yearly. The committee estimate that 40,000,000 lbs. of the product is sold annually in New York State, and the illegitimate business is breaking up the export butter trade. The effect of the deception in the trade is deleterious to business morals. Butterine can be sold at 18 cents less than natural butter. The committee quote extensively from evidence to show the evil, moral, commercial, and sanitary effects of the adulteration. The use of nitric and sulphuric acid in deodorising adulterated butter is particularly condemned. The committee recommend the total prohibition, after a given time, of the manufacture and sale of all butter adulterations. 'The living cow,' assert the committee, 'cannot compete with the dead hog.' The committee also find that 200,000 out of the 500,000 quarts of milk furnished in New York daily in 1882 were water or skim milk. They recommend the appointment of a State milk inspector, and that the official chosen to enforce the anti-adulteration laws be selected from and represent the dairy interests. Accompanying the report was a bill prohibiting, under penalty of 200 dols. or six months' imprisonment, the sale of adulterated milk, keeping cows for the production of milk in an unhealthy condition, or diluting milk with water. It provides that every manufacturer of butter shall brand his name and the weight of the butter on the package. Cans for the sale of milk shall be stamped with the name of the county where the milk is produced, unless sold exclusively in the county. A penalty of 500 dols. to 1,000 dols. and imprisonment for one year is imposed on conviction of the sale or manufacture of bogus butter or cheese. The State Dairymen's Association is appointed a commission to enforce the provisions of the Bill, and 30,000 dols. was appropriated for the purpose.

ANIMALS KEPT IN A MANNER INJURIOUS TO HEALTH.

COMPLAINTS of annoyance caused by noisy animals kept by one's neighbours are by no means rare, but it is not easy to see how the annoyance is to be stopped. According to a report which appeared recently in a newspaper, Mr. Paget, the magistrate at Hammersmith, is disposed to adopt a summary procedure, which may be very convenient, but which savours more of natural justice than of strict law. The complaint before him was of the annoyance caused by the crowing of fowls kept within two yards of the applicant's windows, and after some discussion the learned magistrate granted a summons against the owner of the fowls 'for having animals so kept as to be a nuisance and injurious to health,' the applicant stating that he could call medical evidence to show that his family suffered from the crowing. We have not seen any report of the result of the proceedings upon this summons, but, on the facts stated, it certainly seems as if the magistrate were disposed to twist a statute passed for one purpose to another totally different one. The summons must apparently have been issued under the provisions of the Nuisances Removal Act, 1855, by section 8 of which it is provided that 'nuisance under this Act shall include any animal so kept as to be a nuisance or injurious to health.' Section 13 empowers magistrates to make orders for the removal of unhealthy accumulations of refuse and similar matters, and among them 'to provide for the cleanly and wholesome keeping of an animal kept so as to be a nuisance or injurious to health,' or, if that is impossible, 'to remove the animal,' and empowers them to insist on such orders being obeyed. These powers are undoubtedly given for the purpose of getting rid of accumulations of decaying matter or of animals kept in such a way as to cause effluvia injurious to health, as, for instance, to enable magistrates to prohibit pigstyes or cattle-sheds in crowded neighbourhoods, where they might do harm, and they might apply to the cases of old ladies who will keep too many cats or dogs in their houses. They clearly were not intended to give special powers as to noise. The crowing of cocks may often be very annoying, and in the case of invalids might be most detrimental to health ; but so might be the ringing of church bells, or the rattle of carriages in the streets. Nuisances caused by noise are not, however, matters intended to be dealt with under the Nuisance Removal Acts, and no one would suggest that a magistrate has any summary jurisdiction in the other cases above suggested. Such nuisances have in many instances been dealt with by the superior courts, which have in proper cases granted injunctions to prevent their continuance ; and it seems to us that the nuisance caused by the crowing of fowls stands on the same footing as that caused by the noise made by horses kicking in a stable close to a dwelling-house, against the continuance of which an injunction has in one case been granted. Such a nuisance is either too trivial to be noticed by a court of law at all, or else is a matter to be dealt with in a superior court. The rights of those who keep fowls, as well as of their neighbours who are annoyed, have to be considered, and it is not desirable to have all the relations of life submitted to the jurisdiction and interference of a police magistrate.

DEPOSITS OF DUST AND OTHER OFFENSIVE MATTERS IN EXCAVATIONS.

A WORKING-MAN, residing in Alexandra Road, Richmond, took out a summons against the vestry for depositing or allowing to be deposited about 1,000 tons of 'rotting vegetable and animal matter mixed with dust,' 10 feet thick, covered with 12 inches of gravel, brick-rubbish, and earth. He further stated that a similar deposit had been made in a road close by, 2 feet thick, which smelt horribly when opened afterwards for laying down the surface drain, and was the cause of typhoid fever and blood poisoning. The summons was dismissed on technical grounds, but it should be known that in the opinion of the judges (see Mr. Justice Fry's decision, Goodacre *v.* Watson, on February 22) these deposits

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are contrary to common law. There is most unfortunately a great difference between what constitutes a nuisance at common law, and under the Nuisances Removal Acts, and it is not every one who can afford to take proceedings in the Court of Chancery. Builders and others are too apt in using offensive matters for filling up holes in ground which is either to be built upon afterwards, at a great risk of causing disease ; or where houses will be built upon ground abutting upon these deposits. It is well known that offensive and injurious gases will remain in the interstices of dust deposits for several years, and that decomposition goes on for a long time, so that these injurious gases may be drawn into houses by the action of the fires. Of course much will depend on the contents of the dustbin, and the removal of offensive matters from the heap, but under no circumstances should large deposits be made in the immediate vicinity of houses, as appears to have been done in Richmond. The use of a destructor, such as is employed at Leeds and elsewhere, will convert the animal and vegetable portion of these unsavoury masses into charcoal, and if mingled with road sweepings, into very good material for making mortar when mixed with a proper proportion of lime, or for making up footpaths. The defence of the Richmond vestry was that no notice had been served by them, the sanitary authority, for the abatement of the nuisance, and that therefore the summons could not be sustained. The magistrates took this view of the law and dismissed the summons. It must also be admitted on behalf of the vestry that the amount of the deposit and its bad quality are said to have been much exaggerated by the complainant, but under no circumstances should the vestry have taken an objection, which, if valid, relieves them from all responsibility under these Acts for the creation of a nuisance.

AMERICAN PORK.

THE commissioners appointed by the President to examine into the swine industry of the United States and into 'the allegations as to the healthfulness of the pork products' of the country, have sent in their report, and this and the Secretary of State's report thereon has been printed and submitted for the consideration of Congress. The commission, it may be remembered, was appointed in July 1883, and commenced its work in October. Much evidence was taken, and the whole digested and considered by the end of February. The report deals mainly with the two asserted causes of a diseased condition of the prepared food products, viz., hog cholera, and trichiniasis. As to the first, it is shown that the flesh of swine so diseased does not enter the market packed for human food, and it is demonstrated that the disease is not communicable to human beings. As to trichiniasis the commissioners say, 'Microscopic examinations show that here, as in all other countries, a small percentage of the swine is affected with trichiniasis; probably a smaller percentage than in the countries of Europe. That the occasional presence of trichinæ in our pork is a comparatively unimportant fact is shown by the rarity of trichiniasis among human beings, as indicated by the returns from the State and city boards of health.' It is pointed out, also, that the processes and conditions of packing, and the lapse of time between the slaughter of the animal and the consumption of the prepared flesh abroad, so diminish the vitality and propagative power of the trichinæ as to make it doubtful whether any of these parasites reach Europe in a living state, or in a condition to develop in the human body. So far as known, no single authentic instance, resting on competent scientific testimony, can be adduced of a case of trichiniasis in Europe arising from the use of American packed swine products as food, whether eaten raw or cooked. While the commissioners believe that no legitimate grounds exist for the restrictions imposed on the importation of American pork, they are satisfied that microscopic inspection of all pork for export could be secured at the packing houses if demanded. 'If,' adds the Secretary of State, 'home inspection, with due certification, will open foreign markets for our swine products, it will certainly pay the American exporter to submit to inspection.' The commission suggests that investigations be made as to the origin and transmission of trichinæ and the means of isolating and extirpating the disease. The report is thorough and impartial, and full of information.

THE PUBLIC HEALTH

DURING APRIL 1884.

AT the Royal Observatory, Greenwich, the mean temperature during the month of April was 45°·1 ; it was 0°·9 below the average April temperature in one hundred years, and was below that recorded in the corresponding month of any year since 1879. An excess of temperature prevailed on ten days during the month, while on the other twenty days it was below the average. The warmest day of the month was the 2nd, when the mean was 56°·9, and as much as 11°·2 above the average ; the coldest day was the 22nd, when the mean did not exceed 39°·1, and was 9°·1 below the average. Rain was measured at Greenwich on fifteen days during the month, to the aggregate amount of 1·1 inches, which was 0·6 of an inch below the average April rainfall in sixty-one years. During the first four months of this year the rainfall amounted to 5·8 inches, which was nearly an inch below the average rainfall in the same period of sixty-one years. The sun was above the horizon during 414·9 hours in April, but only 87·9 hours of bright sunshine were recorded at Greenwich. This amount was considerably below the average, and less than that returned in any corresponding period since 1879. Easterly winds prevailed almost throughout the month.

In the twenty-eight large English towns, dealt with by the Registrar-General in his Weekly Returns, which have an estimated population of nearly eight millions and three-quarters, 29,231 births and 18,554 deaths were registered during the five weeks ending the 3rd inst. The birth-rate, which had increased from 31·7 to 36·2 per 1,000 in the four preceding months, declined to 34·8 during April, and was 1·2 per 1,000 below that recorded in the corresponding month of last year. In these twenty-eight towns the lowest birth-rates last month were 26·8 in Huddersfield, 28·4 in Bradford, and 29·3 in Brighton and in Halifax ; in the other towns the rates ranged upwards to 40·8 in Nottingham, 41·8 in Newcastle-upon-Tyne, and 44·2 in Sunderland. In London the birth-rate last month was 33·9, while in the twenty-seven provincial towns it averaged 35·6 per 1,000.

The annual death-rate in the twenty-eight towns, which had been 20·5 and 22·0 in the two preceding months, was 22·1 per 1,000 during the five weeks of April, and was below that recorded in these towns in the corresponding periods of the two preceding years 1882–83, when it was 22·7 and 24·1 per 1,000 respectively. The lowest rate of mortality last month in these towns was 16·4 per 1,000 in Leicester. The rates in the

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other towns, ranged in order from the lowest, were as follow:—Derby, 18·0; Huddersfield, 18·2; Brighton, 18·7; Bristol, 18·9; Hull, 18·9; Norwich, 20·3; Bradford, 20·4; Birkenhead, 20·7; London, 21·2; Salford, 21·3: Newcastle-upon-Tyne, 21·3; Sheffield, 21·8; Birmingham, 22·0; Sunderland, 22·6; Portsmouth, 22·7; Blackburn, 22·9; Halifax, 23·2; Plymouth, 23·4; Bolton, 23·8; Nottingham, 24·4; Preston, 24·6; Liverpool, 25·0; Cardiff, 25·0; Leeds, 26·7; Manchester, 27·3; Oldham, 28·1; and the highest rate 28·2 in Wolverhampton. While the death-rate in London during April, as above stated, did not exceed 21·2 per 1,000, it averaged 22·8 in the twenty-seven provincial towns. The 18,554 deaths from all causes in the twenty-eight towns during the five weeks of April included 2,727 which were referred to the principal zymotic diseases, of which 927 resulted from whooping-cough, 809 from measles, 396 from scarlet fever, 206 from 'fever' (principally enteric), 162 from diarrhœa, 124 from diphtheria, and 103 from small-pox. These 2,727 deaths were equal to 14·7 per cent. of the total deaths, and to an annual rate of 3·25 per 1,000. This zymotic death-rate showed a further increase upon that which prevailed in the two preceding months, and considerably exceeded that recorded in the corresponding period of last year. The death-rate in London from the principal zymotic diseases during April was equal to 3·61, and exceeded by 0·67 per 1,000 the average rate in the twenty-seven provincial towns, among which this zymotic rate ranged from 0·7 in Halifax, 0·8 in Brighton, and 0·9 in Hull, to 4·3 in Wolverhampton, 4·6 in Portsmouth and Liverpool, and 4·9 in Leeds. Measles caused the high zymotic death-rates in Wolverhampton and Portsmouth, whooping-cough in Liverpool, and measles and scarlet fever in Leeds.

Whooping-cough, as in the first three months of the year, was the most fatal zymotic disease in the twenty-eight towns during April. The death-rate from this disease, which had steadily risen from 0·26 to 0·89 per 1,000 in the six preceding months, further increased during April to 1·10 per 1,000, which considerably exceeded the rate in the corresponding month of last year, when it was only 0·62 per 1,000. The rate of mortality from whooping-cough in London was as much as 1·58 per 1,000, and was more than twice as much as in the provincial towns, among which it averaged 0·70 per 1,000, but was equal to 1·27 in Salford, 1·80 in Liverpool, and 2·11 in Bolton. The death-rate from measles, which in the two previous months had been 0·46 and 0·79, further rose to 0·96 per 1,000 during April, and exceeded the rate recorded in any month since the corresponding one of 1882. In London the rate of mortality from measles was 0·99, and slightly exceeded the rate in the twenty-seven provincial towns, among which it averaged 0·94, but was equal to as much as 2·20 in Leeds, 2·72 in Oldham, 3·46 in Wolverhampton, and 3·53 in Portsmouth. The death-rate from scarlet fever, which in the five previous months had steadily declined from 0·84 to 0·50 per 1,000, further fell to 0·47, a lower rate than has been recorded since May 1883. In London the rate of mortality from scarlet fever did not exceed 0·35 per 1,000, while in the twenty-seven provincial towns it averaged 0·58 per 1,000, and was equal to 1·12 in Cardiff, 1·59 in Leeds, 1·78 in Preston, and 2·19 in Sheffield. The death-rate from 'fever' was 0·25 per 1.000, and showed a slight increase upon the rates prevailing in recent months, though it was considerably lower than that recorded in the corresponding periods either of 1882 or 1883. The fever death-rate last month in London was equal to 0·22 per 1,000, against an average of 0·26 in the provincial towns, among which the greatest proportional fatality of this disease occurred in Bolton and Blackburn. The rate of mortality from diarrhœal diseases during April was below the average of corresponding months in recent years. The death-rate from diphtheria in the twenty-eight towns, which had declined in the four previous months from 0·21 to 0·14 per 1,000, was 0·15 in April; this disease was twice as fatal in London last month as in the provincial towns; it caused 8 deaths in Portsmouth, 8 in Leeds, 7 in Birmingham, and 6 in Cardiff. During the five weeks of April 103 fatal cases of small-pox were registered in the twenty-eight towns; of these, 54 occurred in London, 14 in Liverpool, 8 in Newcastle-upon-Tyne, 7 in Sunderland, 7 in Birmingham, 7 in Sheffield, 3 in Hull, 1 in Wolverhampton, 1 in Derby, and 1 in Manchester. Judged by the returns of the Metropolitan Asylum Hospitals, the prevalence of small-pox in London showed a very considerable increase during April. The number of small-pox patients under treatment in these hospitals, which had steadily increased in the six preceding months from 41 to 264, further rose to 502 at the end of April, and exceeded the number of any period since September 1881. The average weekly number of new cases admitted to these hospitals, which had been 18, 21, and 52 in the three previous months of this year, rose during April to 84.

The rate of infant mortality in the twenty-eight towns, measured by the proportion of deaths under one year of age to births registered, was equal to 148 per 1,000 during April, which was considerably below the rate recorded in these towns in the corresponding month of either of the two preceding years. The rate of infant mortality in London did not exceed 139 per 1,000, while in the twenty-seven provincial towns it averaged 155 per 1,000; and ranged from 105 and 107 in Birkenhead and Brighton, to 194 in Plymouth, 195 in Cardiff, and 201 in Oldham.

The rate of mortality from diseases of the respiratory organs, judged by the metropolitan returns, was below the average throughout the month of April. The weekly number of deaths referred to these diseases in London averaged 329, and the annual death-rate did not exceed 4·3 per 1,000, against 6·2 in the corresponding month of 1883. The annual rate of mortality from these diseases in Liverpool last month was equal to 5·7 per 1,000.

The causes of 468 of the 18,554 deaths registered in the twenty-eight towns during the five weeks of April were not certified, either by registered medical practitioners or by coroners. These uncertified deaths were equal to 2·5 per cent. of the total deaths, and almost corresponded with the proportions in the three preceding months. The proportion of uncertified deaths in London did not exceed 1·4 per cent., whereas it averaged 3·4 in the twenty-seven provincial towns, among which the proportions ranged from 0·0 and 0·7 in Plymouth and Norwich, to 6·4 in Hull, 6·5 in Halifax, and 7·6 in Oldham.

Among the population living in the outer ring of suburban districts around London, estimated at 1,074,634 persons, the annual death-rate was equal to 17·6 per 1,000 during April, against 17·8 and 19·0 in the corresponding periods of 1882 and 1883. During the five weeks ending the 3rd inst., 93 deaths from whooping-cough, 49 from measles, 22 from diphtheria, 19 from 'fever' (principally enteric), 19 from scarlet fever, 16 from small-pox, and 9 from diarrhœa, were recorded in the outer ring. These 227 deaths from the principal zymotic diseases were equal to a rate of 2·2 per 1,000, which slightly exceeded the rates recorded in the two preceding months. The fatality of small-pox, measles, and fever showed a marked increase, while that of scarlet fever and diphtheria declined. In the district of West Ham, 25 deaths from whooping-cough, 9 from measles, 8 from scarlet fever, and 4 from diphtheria were recorded during the month. Of the 16 fatal cases of small-pox registered in the outer ring, 10 occurred in West Ham district, and 6 in the district of Edmonton; and 11 deaths from measles were returned in Kingston sub-district.

AN application has been made to the Newcastle and Gateshead Water Co., to supply the mining villages of Mickley and Hullyards with water; the matter is now under the consideration of the directors of the company.

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SPECIAL REPORTS.

SOCIETY OF MEDICAL OFFICERS OF HEALTH.

A MEETING of the society was held at 1 Adam Street, Adelphi, on Friday, April 18; Dr. T. O. Dudfield in the chair.

The Council presented a report on the following subjects :—

1. The London Government Bill.—The Council reported that without expressing an opinion upon the Bill as a whole, they noted with satisfaction that its provisions appear well calculated to promote the much needed unity of sanitary administration.

2. The Conferences at the Health Exhibition.—The Council reported that they had arranged for papers on various health subjects by members of the society.

A paper was read by Dr. Alfred Ashby, medical officer of health for Grantham, Newark, and Sleaford Combined Sanitary District, on 'The Fallacies of Empirical Standards in Water Analysis, as told by the story of a Polluted Well,' which will be found on page 530.

After a few remarks from the President, Mr. Otto Hehner dwelt upon the uselessness of a single analysis of a sample of water as affording evidence of its wholesomeness.

Mr. Blyth stated that under the circumstances under which Dr. Ashby had worked, the estimation of a single element had some value, but that it was necessary for analysts to take into consideration every element, and that chemical analysis should always be supplemented by the use of the cultivation method.

Dr. Tripe was also of opinion that the cultivation method had much value.

The paper printed at page 534, giving an account of an outbreak of small-pox at the East End of London during March of the present year, was then read by Dr. J. W. Tripe, medical officer of health for Hackney.

The President pointed out that the prevalence of small-pox round the Fulham Hospital did not follow the course of any prevailing wind.

Mr. Blyth thought that the eddies in different streets would not always take the same course as the prevailing wind.

The society then adjourned.

QUESTIONS AFFECTING OWNERS OF HOUSE PROPERTY AND DWELLERS IN TOWNS.

AT the thirty-sixth annual meeting of the Association of Trade Protection Societies of the United Kingdom, held on April 30, at the Westminster Palace Hotel, Alderman Bennett, of Manchester, in the chair, the following subjects of interest to our readers were discussed.

PUBLIC TOWN IMPROVEMENTS.—In reference to public town improvements, Mr. Hutchinson (Nottingham) proposed without comment :—

'That the present system of owners of property demanding large compensation when public improvements are being made, such compensation frequently amounting to double or treble the value of property affected, largely tends to increase public burdens for the sake of private gain, hinders improvements because of the enormous cost, occasions the retention of unhealthy properties, and so interferes with the public health, prevents the erection of comfortable dwellings for the poor in central situations, and altogether is a source of great inconvenience in large towns.

'That a petition to Parliament be presented, praying that means may be adopted for insuring that when Corporations or Local Boards require to take properties for improving the width of streets, or the erection of central dwellings for the poor, or other public improvements, only a fair value shall be paid for such properties; such value to be based on past income, together with the ordinary saleable value of the property, in the open market, in like manner as is provided with regard to unhealthy areas, such value to be decided by a duly-constituted authority; but this benefit ought not to be granted to any dividend-paying companies, or other speculative combinations where private gain is to be obtained.'

The resolution was seconded by Alderman Witty, of Hull, and carried unanimously.

NOISY OR OFFENSIVE TRADES.—In reference to noisy or offensive trades, Mr. Hutchinson (Nottingham) moved the following resolution :—

'That whereas it is essential to the well-being of the community that certain trades—some of which are noisy (such as blacksmiths, boiler-makers, and certain other mechanical trades) and others offensive (such as candle-makers, brick kilns, bone and chemical works, &c.) by reason of smell, smoke, or vapour—should be carried on;

'And whereas no authority at present exists to whom a person proposing to commence and carry on such trades may apply, yet such trades having been instituted an action may be brought to remove or restrain, and thereby a person carrying on such trade may suffer considerable loss;

'Resolved, that it is desirable that an authority should be instituted to whom a proposed promoter of such trade may apply for leave to carry on such trade, and such authority should be required to hear evidence in favour thereof, and the adjoining occupiers should have a right to object thereto, and the authority should have power to direct that leave be given for the establishment of such trade, and to define the conditions under which the same may be carried on.'

He contended that there should be some authority to decide questions of this nature without tradesmen being liable to expensive legal proceedings.

Alderman Witty, of Hull, seconded the proposition, which was carried.

EXHIBITION OF BUILDING APPLIANCES AND GAS APPARATUS AT BIRMINGHAM.

THE third Exhibition of the Building Trades Appliances was opened on April 28 at Bingley Hall, Birmingham, and will close on Saturday next, the 17th inst. As on previous occasions, it is under the management of Mr. Shrapnell, of the Agricultural Hall, London, and is this year supplemented by a collection of gas apparatus; the Corporation of Birmingham, who have the control of the gas supply of the borough, having provided the gas for working the exhibits gratuitously. It is now about six years since a gas exhibition was held in Birmingham, and it has on this occasion proved the most attractive feature in the Exhibition. Having in the SANITARY RECORD for April 15 described the principal exhibits at the Agricultural Hall at the recent Building Exhibition held there, it is unnecessary to repeat the descriptions, many of the exhibits being the same as shown in London. Except as regards specialities in gas apparatus, it is again needless to trouble our readers with descriptions which will mainly be given in our weekly Exhibition Record of the International Health Exhibition, the first number of which was published on Saturday, May 10, and which will be sent gratis to every subscriber to the SANITARY RECORD until the report is complete. It will form when finished an independent record of the important display at South Kensington.

Gas appliances in all their variety from the simple boiling-stove to the 4 or 5-horse power engine were to be seen at Bingley Hall. With one or two exceptions, which by the way are noteworthy ones, the chief exhibits were those of local firms.

The exhibits of Messrs. Wright & Co. and Messrs. Arden Hill & Co., of Birmingham, and Messrs. Siddaway & Son, of West Bromwich, were amongst the most interesting display of gas cooking apparatus.

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Messrs. G. Bray & Co., of Leeds, the pioneers of improvements in flat flame burners and the original inventors of flat flame cluster burners of great power for street lanterns, which so advantageously compete with the Argand street lamp, contributed a display which was an unceasing source of attraction and interest alike to the ordinary visitor and the professional man. Here were to be seen the familiar 'Fishtail' and 'Batwing' burners in their most improved form, and in a variety of sizes, and at a nominal price. Then their street lanterns, fitted with the flat flame cluster burners, were shown in many sizes up to one which will give a light of 2,000 candle power, clearly demonstrating that when science is brought to bear in the construction of gas burners, as powerful lights may be produced by this agency as by electricity, while it is at once more regular and, as a rule, much more economical. For many purposes, even when the electric light becomes more fully developed, gas will always be first favourite.

Another exhibit calling for special notice was that of Messrs. Beynon & Cox, of the Torbay Iron Works, Torquay. This collection comprised several sizes and patterns of Cox's Patent Heating and Ventilating Stoves, which gained the highest awards at the Smoke Abatement Exhibition; an equally good assortment of Cox's Patent 'Saveall' Cooking Stoves, and 'The Withers' Patent Gas Engine. The economical and efficient qualities of these heating and cooking stoves have been pointed out on other occasions in our columns. An illustration is appended of one of the most recent introductions in the latter class. This, as a glance will show, is a griller and boiler combined—an article of which there are numerous designs

before the public, but this one excels them in every respect. Amongst its salient features are firstly, no gas fumes can come in contact with the food being cooked, and it is at the same time absolutely free from smell; secondly, its wonderful economy, exemplified by the fact that it will cook two large chops, or toast six slices of bread, and boil two quarts of water ten times for one penny; the cost of the apparatus itself being half a guinea.

The following block depicts 'The Withers' Patent Gas Engine, a machine that is rapidly coming into favour. Though but a decade ago the idea of using gas as a motive power had hardly been conceived, and the number of years that gas engines have to any extent been used may be counted on the fingers of one hand, they are at the present moment in almost universal demand, and though to say that the name of their makers is 'legion' would be somewhat exaggerating, there is a very considerable variety to be had, of which the one in question possesses many advantages over all those known as small power gas engines. A close inspection of the drawing will show that there are but few working parts, and nothing of the nature of cog-wheels or similar complications liable to cause friction or soon to get out of order. In this engine an explosion takes place at every revolution; the motion is therefore much more regular than is possible when, as in most others, it takes place once in two or three revolutions; in the latter case the speed must of necessity be much greater directly after an explosion than it is immediately before the succeeding one. The Withers Engine can be depended on to start in ten

seconds at any time, and is so simple that any labourer can take to pieces, clean, and put it together again in fifteen minutes.

Among the other good gas engines shown here are Messrs. Crossley Bros.' 'Otto,' and Messrs. Andrew & Co.'s 'Bisschof,' while several others of less note help materially to swell this class.

The accessories, such as meters, regulators, burners, and other fittings are fairly represented, and render this section very complete.

HIGH buildings have proved to be so remunerative to capitalists in Chicago, that many more will be erected the present season. During one week recently, permits were granted by the building department for two ten-storey, three nine-storey, one eight-storey, and one seven-storey buildings.

PROFESSOR VIRCHOW has written to the German newspapers to express his opinion, arrived at after careful scientific examination of the subject, that the danger arising from trichinosis in German pork is 'infinitely greater' than the peril of an epidemic from American-bred pigs, and that, to be consistent, the Imperial Government, which has forbidden the importation of all sorts of pig-flesh from the United States, ought not to allow the rearing of any swine at all in Germany.

THE Æolus Waterspray and General Ventilating Company, Limited, whose business has passed into the hands of the late engineer of the Company, Mr. R. Oakley, 235 High Holborn, have recently supplied their system with complete success to the Royal Academy, under the direction of Mr. Norman Shaw, the Beckenham Town Hall, under Mr. George Vigers, and the Banqueting Hall of the Mercers' Company, under Mr. G. Baines Williams. Mr. Oakley has just received instructions from the Ecclesiastical Commissioners to apply the same system to the Church of St. Peter, Limehouse, under the direction of Mr. Ewan Christian.

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REPORTS OF MEDICAL OFFICERS OF HEALTH.

BERMONDSEY.—It is evident, from Dr. Dixon's report for 1882, that the sanitary work in this important parish is being carried on with energy and ability. 'Twenty years ago,' the medical officer states, 'it was supposed that every cesspool in the parish had been done away with, and yet the inspector succeeds in finding some every year. Last year twenty were abolished. Many old and dilapidated brick drains of an unnecessarily large size, and with no sufficient fall, are nothing better than so many elongated cesspools; 135 drains of this kind have been taken up and relaid with stoneware glazed pipes.' A large number of houses were examined with regard to their water-supply, and among them, thirty houses in courts were provided with a constant supply by means of permanent stand-pipes. 'This,' Dr. Dixon remarks, 'is really the cheapest and best way of supplying the very poor with a sufficiency of pure water, and of avoiding its contamination subsequent to its delivery.' The prevalence of measles and whooping-cough were the most important features of the vital statistics. These two diseases contributed 287 deaths out of a total of 1,913, and were chiefly accountable for the large zymotic mortality—4·79 per 1,000. Accompanying this excessive zymotic death-rate, was a heavy infantile mortality, the proportion of deaths in children under one year of age to registered births being 158 per 1,000. The birth-rate, 39·8 per 1,000, was the lowest recorded for eleven years, but was still 5·5 above the London rate for the corresponding period. Though the general death-rate, 21·8 per 1,000, did not compare favourably with that for each of the three preceding years, it was within the average, and only very slightly in excess of the London rate, which was 21·4.

BRADFORD, YORKS.—Mr. Butterfield's appointment as health officer to the West Kent combined district invests his last report to the Bradford authority with an additional interest. Unfortunately the year 1882 was an unfavourable one for reviewing the extent of sanitary progress, since, owing to the continued depression in trade and the consequent depreciation of property, costly improvements on a large scale—such as the opening out of back streets and other works involving demolition—had to be deferred. Prompt and effective attention was, however, bestowed upon those conditions injurious to health which could be removed without much expense. Thus, in 1,705 houses the sink drains were disconnected, 1,109 drains were opened and cleansed, and in a large number of instances privies and ashpits were remodelled and removed from objectionable sites. An important addition was made to the sanitary arrangements of the district by the enlarging of the refuse destructor. Without this apparatus, Mr. Butterfield remarks, 19,438 loads of rubbish containing animal and vegetable refuse would have been tipped within the borough, and probably in the course of a few years would have formed the site of eligible villa residences or workmen's cottages! The present system of scavenging is an evil of great magnitude, and one that calls for immediate and radical reform. When the borough was inspected in 1872, on account of the prevalence of enteric fever, Mr. Netten Radcliffe suggested that all privies should be constructed, or re-constructed, so as to permit of not more than one week's accumulation, and that they should be regularly scavenged. The principle of this recommendation was ignored, and a form of privy and ashpit adopted capable of containing a cartload of filth, which was emptied as a rule not oftener than once in three months, and in many cases less frequently. Many modifications of the original plan have from time to time been adopted, but the radical defect in principle remains the same, and the evil is increased by the questionable system of night scavenging. No less than 80 per cent. of the total number of cases of enteric fever occurred in streets and localities which were not paved, and many of them close to privies and ashpits, which, from their faulty construction, were the cause of considerable nuisance. The death-rate per 1,000 inhabitants was, from all diseases, 21·3, and from zymotic diseases 3·2. This proportion was 1·7 more than in the exceptionally healthy year 1881, but 2·1 less than the average of the ten preceding years. The increase of mortality was due to an epidemic of measles in the early part of the year, and to the increased fatality of diarrhœa in the summer and autumn months. Speaking of the provision requiring the compulsory notification of infectious disease, which proved of signal benefit to the borough, Mr. Butterfield observes that, so far as the public is concerned, he has every reason to believe that the Act is strongly approved of.

CALCUTTA.—Dr. McLeod treats in a very able and concise manner the health history of Calcutta during 1882. Considerable progress was made in its sanitary condition, measures for the improvement of the town having been pushed on with vigour. New roads have been made, foul drains have been piped and converted into clean pathways, new areas have been provided with sewers, and the houses connected with these for the removal of house and bath washings, which previously stagnated and stank. Streets have been widened, and facilities provided for the removal of refuse; tanks, and wells containing water which had been accurately described as diluted sewage, have been filled up, and substantial progress made in the reclamation of some of the worst *bustees* of the town. But although great sanitary improvements have been accomplished, and year by year palpable progress is being made in the direction of reform, Dr. McLeod is convinced that there still remains much to be done before the sanitary condition of the town can be pronounced in any sense satisfactory. This fact found loud expression in the shape of a public agitation which took place in 1882 and again in 1883. On each occasion the municipality responded by appointing a carefully selected committee for the purpose of inquiry and deliberation The outcome of these proceedings has been (*a*) the organisation of a nuisance department, (*b*) the organisation of an establishment for *bustee* conservancy, (*c*) the assignment of more money for *bustee* improvement and general conservancy, (*d*) change of method in dealing with rubbish in certain parts of the town, (*e*) accelerated effort to increase water supply of the town, and (*f*) careful study of the sewer system and consideration of measures necessary for its improvement. Considerable and decided progress may therefore be expected in the sanitary circumstances of Calcutta, and Dr. McLeod's subsequent reports will be looked for with no little interest. The death-rate for 1882 represented 30·4 per 1,000, being higher than the decennial mean by 1·1. Cholera was the main cause of the increase, causing 2,240 deaths against a mean of 1,341, but 'other causes' were also fatal to an extent beyond the average. Diarrhœa and dysentery, and fevers, were not so fatal as in 1881. Commenting on the cholera mortality, Dr. McLeod observes that in all cases in which the disease presented any tendency to grouping, special investigation was made, and in every instance in which several cases had occurred in a house or village, or within circumscribed limits, glaring unsanitary defects were discovered. It is satisfactory to learn that these were removed as promptly as they were notified.

EPPING RURAL.—The most important item in the sanitary work carried out in this district during 1882 was the completion of the Infectious Hospital at Rood Street. Much labour was spent in the improvement of the drainage system, and Mr. Fowler states that 'the time appears to be rapidly approaching when almost every house in the townships of Epping, Harlow, and Buckhurst Hill will be connected with the respective sewerage systems that have been provided.' 'As regards Buckhurst Hill,' Mr. Fowler continues, 'this may, in fact, be said to be the case now. It will be remembered that, in consequence

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of some extravagant statements and complaints to the Local Government Board, which were made by one of the residents as to the unhealthiness of that locality, a special inspection was made, the result of which was that it was shown beyond doubt that the sanitary condition of Buckhurst Hill was in every respect satisfactory.' Another matter that received a large amount of attention was the question of water supply. Sixty-four notices to provide water were sent out, and 140 houses were supplied after notice. There was a considerable extension of the mains of the East London and the Herts and Essex Waterworks Companies during the year. The birth- and death-rates were respectively 27·9 and 17·2 per 1,000 population, against 31·4 and 14 for the previous year. The proportion of deaths in children under one year of age to registered births was 126·6 per 1,000. Of the zymotic diseases, diphtheria and whooping-cough were exceptionally fatal, and it was to the prevalence of these diseases that the large zymotic death-rate (2·6 per 1,000, or twice that for 1881) was largely attributable.

FEATHERSTONE.—Fairly good sanitary progress was made in this district during 1882, but it is evident that the authority have yet much work before them. Thus, while the main sewerage system may be the complete success described in the report, the house drainage is far from perfect. The ventilation is defective, and the trapped grates are, in a large number of cases, much too small. Refuse removal is also very imperfectly carried out, and Mr. Buncle again advises his authority to themselves undertake the scavenging of their district, a system which has been found to work admirably elsewhere. Three deaths out of a total of four registered from typhoid fever occurred at Loscoe, a village notorious for its unsanitary surroundings. The remaining death happened at South Featherstone, where a limited outbreak of the disease prevailed. On inquiring into the subject, Mr. Buncle found that the only thing in common was the milk, which seems to have been infected by the rinsing of the utensils with water obtained from a polluted well. With the exception of typhoid, zymotic disease was not present in any serious form. No case of small-pox occurred, and, in referring to the immunity which his district has of late enjoyed from this disorder, the health officer remarks that, while no children were unaccounted for as regards vaccination, a much larger proportion than usual left unvaccinated, some of whom have since emigrated to America. No certificates of their protection have been received, and Mr. Buncle expresses his surprise at the occurrence. Doubtless the forthcoming report of Dr. Blaxall on the circumstances of emigrants previous to their departure from this country will throw some light on the subject. The total number of deaths registered from all causes was 130, returning a death-rate of 21·8 per 1,000. Chest affections were fatal to 24 persons, phthisis to six, and heart disease to seven.

GEORGETOWN.—The office of Town Superintendent, held at Georgetown by Mr. L. M. Hill, C.E., appears to have no exact equivalent in our own sanitary administration, though Mr. Hill's duties appear to be chiefly those of a surveyor. Mr. Hill's report deals with tramways—'stellings'—appliances for preventing the accumulation of silt in rivers, markets, &c., in addition to the more strictly sanitary subjects of drainage and water supply. In this last respect Georgetown has set an example which might well be followed at home in providing not only a plentiful supply of water, but an uninterrupted day and night service. At the date of the report arrangements were being made for extending the mains, providing additional pumping machines, and for filtering the water, which is obtained from the Lamaka canal. The drainage works have been considerably improved, but in this direction also further progress is contemplated. Speaking of the condition of the roads of his district, where the cost of broken stone is about three times what it is in England, Mr. Hill thinks that, after making some allowance for the differences of subsoil, &c., they bear favourable comparison with most of the macadamised streets of our own provincial towns, and in the suburbs of London itself. During the year under report 9,983 separate inspections were made of houses, and 1,340 of provision shops; 24.173 loads of rubbish and manure were collected, and the carcases of 6,565 animals and birds found in the streets were properly buried. Altogether 6,213 notices were served for the performance of various requirements, and in sixteen instances convictions were obtained for breaches of the Sanitary Regulations. The question of refuse removal is receiving the consideration of the town council, whose deliberations should be guided by the report (see SANITARY RECORD, August 1883, p. 66) prepared by their superintendent on the subject after a visit to several towns in England and Holland.

GUILDFORD RURAL.—Although it is a pleasure to record the very favourable health statistics of this district for 1882, it is still more satisfactory to note that the authority's officers are not relaxing their efforts in the way of sanitary improvements. During the year a site was selected for the erection of an isolation hospital for the reception of infectious cases from the non-pauper class, and works were in active operation for providing a number of villages with a constant supply of pure water. Both the general and zymotic death-rates were very low, being respectively 12·5 and 0·9 per 1,000. The death-rate in children under one year of age was also extremely favourable, being only 78·8 to every 1,000 births registered. One case of small-pox is worthy of mention from the fact that, in the opinion of the medical officer, it was caused through the medium of rags, which appear to be frequently instrumental in the spread of infection. The most interesting item in the year's history, however, was an epidemic of diphtheria, which, in the month of May, was discovered to be existing in the parish of Pirbright. The outbreak led to a Government inquiry, during which 106 cases were found to have occurred, 77 of which were children under fifteen years of age. Only 9 cases terminated fatally, all of which were children not twelve years old. The incidence of the disease was, for the most part, upon children attending school. An inquiry into the sanitary condition of the village school did not, however, furnish any clue as to the origin of the outbreak, for the arrangements were found to be excellent. Four times in the course of the year was the school closed, and it is both a remarkable and a significant fact that although, on each occasion, there was an immediate diminution or cessation of the disease, no sooner was the school reopened, than fresh cases immediately arose, and this, notwithstanding that, during the time the school was shut, 'all houses and clothing had been disinfected, and no child allowed to return to school from an invaded house, until some weeks had elapsed from the first seizure. The school-building, too, was fumigated, and lime-washed, and even the very books and maps destroyed.'

HANLEY.—Dr. Walker's account of the sanitary work carried out in this borough during 1882 is certainly satisfactory: 1,250 houses and premises were visited by the sanitary inspector, and 438 houses by the medical officer himself; 125 drains were repaired, and 39 trapped, exclusive of those done by order of the sanitary authority in default of notice. More than 4,000 whitewash brushes were lent out, which really represent so many houses whitewashed and cleansed. To sum up the sanitary work in Dr. Walker's own words, 'more good sanitary improvements were executed during 1882 than have been done for many years.' The birth-rate was 39·5 per 1,000—an unusually low one, compared with previous years—and the death-rate 22·3. With one exception, the rate of infantile mortality was the highest recorded for ten years. More than half the total deaths were those of children under five years of age, while the mortality in children not one year old was equal to 20·6 per 1,000 births registered. A remarkably large number of deaths resulted from prema-

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ture birth, there being an increase of fully 50 per cent. in deaths from this cause, as compared with the previous year. The zymotic death-rate was 3·1 per 1,000 living. Scarlet and enteric fevers were more fatal than they had been for many years, while the deaths referred to measles were exceptionally few. It is satisfactory to note that not a single case of small-pox occurred during the year, and, further, that only 3 deaths have resulted from this disease since the commencement of 1872—viz., 2 in 1876, and 1 in 1880.

HEXHAM RURAL.—The question of improving the water supply in various portions of this district seems to have received a large share of attention at the hands of the authority during 1882, and they could scarcely have devoted their energies to a more important subject. But other sanitary matters were by no means neglected, for in the course of the year more than 200 nuisances, caused chiefly by structural defects, were abated or removed. The vital statistics, which Dr. Maclagan has treated in a very efficient manner in his annual report, compared favourably with those recorded for many previous years. The birth-rate, 28·4 per 1,000, was below that for the preceding period, as was also the death-rate (15·6 per 1,000), the latter, though, to an extent scarcely appreciable. Of the total deaths, 7·2 per cent. were referred to zymotic diseases, representing a rate of 1·1 per 1,000 of population. However slight it may be, it is always pleasing to record a diminution of infantile mortality in a district. In the district under consideration, the deaths from infantile diseases in 1882 were equal to 16 per cent. of the total mortality, and 2·5 per 1,000 of the population, whereas in the previous twelve months they were equal to 19 per cent. of the total mortality, and 2·98 per 1,000 of the population. Referring to the subject of infantile mortality, Dr. Maclagan, like many other health officers, expresses his strong disapproval of the principle of insuring the lives of infants, which, in his opinion, leads 'undoubtedly to actual, if not to intentional, neglect.'

HUDDERSFIELD.—No special sanitary work was carried out in this district during 1882. The year's mortality was at the rate of 22·4 per 1,000 persons living. Though higher than that for the preceding years, this rate compares favourably with the average for the previous fifteen years. The infantile mortality was very large, 468 deaths, or 183 per 1,000 births, occurring in children under one year. This rate is 10 per 1,000 above the average of the five previous years. The zymotic death-rate was equal to 2·63 per 1,000, a trifle above the average for the preceding quinquenniad. Small-pox did not account for a single death, nor was the mortality arising from scarlatina, continued fever, and diarrhœa so great as the average for the five preceding years. The mortality from diphtheria and whooping-cough showed some increase, but the greatest increase was from measles. During the third quarter of the year this disease prevailed in epidemic proportions. The death-rate from measles—964 per million—was three times the average for the five previous years. The natural result of this epidemic was an extremely high infantile mortality, 105 children under five years of age dying during the month of August. This large death-rate led the authority to take special measures to insure more frequent scavenging, the flushing of the drains, and the cleansing of the houses themselves in the most populous yards and courts of the town. The adoption of these measures resulted in an appreciable decrease in the infantile mortality in the following month. Dr. Cameron draws particular attention to the fact that the epidemic of measles coincided with a high barometric pressure, an increasing temperature, a considerable variation of day and night temperatures, and a scarcity of rain, and he is of opinion that the spread of the disease was largely due to these meteorological influences.

IPSWICH.—During 1882 the arterial system of sewerage, which has been introduced into this borough, was actively carried on, and 'large areas of streets, that had for years been in difficulties, were relieved.' In speaking on the subject of sewer ventilation, Mr. Elliston draws special attention to the admission into the sewers of hot refuse from steam engines and factories, and it may be interesting to quote what he states on the point: 'It is a well-known fact that when the temperature of a sewer reaches 55° F., or thereabouts, putrefactive changes will take place, especially if it contains deposited filth; therefore it becomes a question whether the practice of turning in large quantities of steam and hot water from factories should not be prohibited.' One of the most useful improvements effected during the year was the reconstruction of the drainage of the East Suffolk Hospital, which, in the opinion of the medical officer, may 'now be pronounced one of the best drained institutions in any provincial town.' It was not to be expected that the general death-rate would be so low as that of the previous year, which was the lowest recorded, but it was, nevertheless, below the average, being 20·7 per 1,000 inhabitants. Of the total mortality, slightly over 36 per cent. occurred in children under one year of age. The proportion of deaths of children under one year to registered births was 14·2 per cent. Zymotic diseases were not more than ordinarily fatal, the rate being 1·86 per 1,000. A special feature of the year was an outbreak of small-pox among the rag-sorters at a paper mill. It seems probable that the infection was introduced into the rag warehouse in a parcel of white rags, and that the mode of reception of the infection, in the first instance, was by inhalation of the infectious dust from the rags.

ISLINGTON.—A large portion of Dr. Tidy's report for 1882 is taken up with a very complete statement of analysis of water, and of articles under the 'Sale of Food and Drugs' Acts.' There is nothing in the vital statistics of the year which demands special notice. The birth-rate was the smallest recorded since 1858, being only 34·3 per 1,000 of the population, while the death-rate (18 per 1,000) was, as is usual in this parish, exceptionally low. Out of a total of 5,264 deaths, 1,403 were those of children under one year of age. The principal zymotic diseases (not including diarrhœa) accounted for 739 deaths, which were chiefly due to measles, scarlatina, and whooping-cough. This last disease was particularly fatal, while the mortality from diarrhœa (as might, to some extent, be expected during a wet summer) was remarkably slight.

LANCASTER URBAN AND RURAL.—The defective condition of an old sewer conduit in the urban district has more than once been brought before the authority, who have so far not seen fit to remove the evil. During 1882 this conduit was the channel which conveyed the infection of an enteric fever patient to eight persons, who in turn suffered from the disorder. Referring to the subject, the health officer observes: 'As it is now, the soil in the neighbourhood of the dam is soaked with sewage, especially during the time of high water, and in the damp earth fever-germs harbour and propagate.' Obviously the authority are in serious default in allowing the existence of such a plague spot, and now that they have specific evidence of the mischief it has caused, they may see fit to move in the matter. Measles and diarrhœa were unusually prevalent, and caused together 68 deaths out of a total of 72 recorded from the principal zymotic disorders. In regard to the former, school agency played an important part in disseminating the infection, while insanitary conditions accounted for the latter. The death-rate from all causes represented 20·0 per 1,000, and from diseases of a zymotic character, 3·4. In reporting on the rural district, Mr. Harker strongly advocates a system of scavenging which, when adopted and systematically performed, should do much to rid the district of numerous evils arising from offensive accumulations. Owing to the absence of any statistical tables, which are not appended to the report, the mortality is difficult of analysis. The general death-rate is estimated at 17·0 per 1,000, and that from zymotic disease at 2·2. The insanitary condition of Galgate, and

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is being speedily eradicated. The death-rate (17·2 per 1,000) was in excess of the average, the increase being largely due to epidemics of diphtheria and scarlet fever. The zymotic mortality was at the rate of 1·9 deaths per 1,000 living. Referring to the epidemic of diphtheria, Dr. Alford states that a great number of cases of this disease were not recognised as such until the paralysis set in, and gives very sound advice when he tells us 'never to make light of a sore throat, however mild it may be, when diphtheria prevails in a neighbourhood.' It is satisfactory to note that, whereas for the preceding nine years the average annual number of deaths in children under one year was 47, that for 1882 was 43.

TENDRING RURAL.—'Of the sickness in this district,' Dr. Cook writes in his report for 1882, 'it is impossible for me to speak with any degree of certainty, as it is only by my own exertions in making inquiries that I hear of any. It is seldom that I receive notice from anyone except the inspector of nuisances, unless small-pox shows itself, when every person seems to think he is called upon to report.' It is not surprising, therefore, that Dr. Cook's report is somewhat meagre. Taking the whole district, the rate of mortality was 16·9 per 1,000 inhabitants. Of the zymotic diseases, measles and scarlet fever were the most prevalent. Ten deaths were attributed to small-pox, which was carried into one portion of the district by a tramp, who had been an inmate of an infected union house, and into another portion by an unvaccinated child who was brought from South America, and had been exposed to the disease in London on its way home.

WHITECHAPEL.—The vital statistics for the year 1883, as given in Mr. Liddle's annual summary, present no striking feature. The rate of mortality (including deaths of non-residents), in persons of all ages, was 25·3 per 1,000; and, in children under one year, 5·6 per 1,000. If the number of deaths in the London Hospital be eliminated, the former proportion is reduced to 21·9. Of the total deaths, 22 per cent. occurred in children under one year of age, and 10·6 per cent. from zymotic disease.

BUILDING LEASES.—Sir John Jenkins, M.P., and Mr. Powell, M.P., have introduced a bill relating to building leases. They propose that, when land is leased for building purposes for twenty-one years or any longer term, the lease shall in all cases operate as if for a perpetual term of years, whatever agreement there may be to the contrary. And the Bill declares that all contracts inconsistent with its purpose are to be void. Thus any provision in the lease for forfeiture or re-entry on the breach of any condition or on the happening of any event is to be of no effect. Passing to a different subject, the Bill empowers local authorities to acquire land for building purposes. When it is represented by fifty ratepayers that there is insufficient accommodation for the proper housing of the inhabitants of the district, and that it is not possible for them to obtain land within the district for building purposes on fair and reasonable terms, the local authority, on being satisfied of the truth of these representations, is empowered to acquire so much of any available land as is reasonably necessary for supplying the insufficiency of accommodation. As to the mode of getting the land, it is to be the same as under the 176th section of the Public Health Act. Thus the Local Government Board would hold a local inquiry and then grant a provisional order for putting in force the powers of the Lands Clauses Consolidation Act with respect to the purchase of lands. However, a special direction of the Bill is that the service by the local authority on a landowner of a notice to treat is 'in all proceedings in any Court' to be conclusive evidence of the necessity for the acquisition of the land for building purposes and of their being available. When land is thus acquired by a local authority, they may dispose of it as they may determine; the only restriction being that any one who purchases from them must undertake to build on the land according to a plan agreed on.

REVIEWS.

Can Parliament Break Faith? A Conversation on the Supply of Water to the Metropolis.

London Water Supply. Report to the Shareholders of the London Water Companies on the Metropolis Water Bill of 1884.

Reasons against the Metropolitan Board of Works Further Powers Bill.

THE struggle between the metropolitan water companies and the public is becoming more and more embittered. Mr. Dobbs, by his successful appeal, has not settled the dispute, but has apparently only made both parties anxious for further contest. Perhaps this is hardly the right way of stating their relative positions. The consumers of water, or at any rate an active section of them, have, as they think, become alive to their own interests, and see their way to wringing further concessions from the companies, and are constantly proposing new schemes for the direct or indirect reduction of water rates. The companies are not disposed to give up their incomes if they can help it, and having suffered a serious diminution in one quarter, are disposed to make up for it elsewhere, wherever they can get an opportunity of doing so. Not satisfied with cutting down the charges made by the companies, and with showing that in some cases they have exceeded the authorised rates, some zealous water reformers have attempted this year to revise the whole system of charges authorised by Parliament, and to substitute a totally new scale, which, in the opinion at any rate of the companies, would work out very differently from that under which we have lived for the last forty years. The pamphlets which are the subject of this review are issued in defence of the existing system, and with the object of showing that the companies are entitled to remain as they are; and, taken by themselves, make out a strong case. They show that the supply of water at present afforded by the companies is ample in quantity and of fairly good quality; though in doing this rather large demands are made on the credulity of the reader. To assert, for instance, 'that the sewage of the towns on the Thames and its tributaries does not now find its way into the river above the intakes of the water companies,' is to ignore the periodical prosecutions instituted by the Thames Conservancy against the Staines Local Board, and the fact that the sewerage system of many of the towns on the banks of the Thames is supposed to be imperfect. The quality of the water supplied by the London water companies is, however, fairly good as compared with that supplied in other towns, and such overstatements of their case as the one above alluded to may be forgiven. There is no doubt that it is true, as stated, 'that the supply frequently deteriorates after having been delivered by the companies into the cisterns of the consumers,' and that the remedy for that is constant supply. It is also true that the companies are not bound to give a constant supply, and that in many districts they do now give one, and so have given the consumer a benefit which their Acts of Parliament do not entitle him to demand; though it is to be supposed that they find it not to be disadvantageous to themselves to give it.

On the above grounds the position of the water companies is shown to be and is fairly strong; but they occupy a stronger position when they assert that the proposed alteration in their legal powers is an attack on the rights of property. The power of charging in proportion to the value of the tenements supplied with water was conferred by the Waterworks Clauses Act of 1847 and regulated by the numerous private Acts of the different companies. Few people now dispute that the rates of charges authorised were in some cases authorised improvidently, and that the result has been to enable water companies to charge sums which produce an income far in excess of what was contemplated as probable either by

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Parliament or by themselves. If the companies were now asking Parliament to grant them the powers they have, they would in all probability be refused; but it is a very different matter to ask Parliament to take away powers already given, on the faith of which capital has been subscribed and works of public utility have been constructed. The companies assert that the proposal of the Bill promoted by the Corporation of London, to substitute payment by meter for payment by rental, would necessitate the expenditure of a sum of at least 2,000,000*l.*, and probably much more, for providing and fixing meters, and that they themselves have no capital available for that purpose. They point out truly enough that the meters must in some shape be paid for by the consumer, and that the cost would have to be added to the price paid for water. They also assert that the price of 6*d.* per 1,000 gallons proposed by the Bill would not be remunerative to the companies, and would on the average diminish the quantity of water supplied per house without diminishing the sum paid by the occupier. Whether this assertion is based on correct data or not, it is needless now to inquire, as the Bill promoted by the Corporation has been thrown out for this year, and the companies are for the present relieved from the changes threatened by it.

The companies are quite aware that sooner or later the public must acquire their property, and they of course wish to get the best possible price for it. They point to two cases of large towns in which waterworks have been purchased in recent years, that of Stockton and that of Birmingham, in both of which the companies were paid a price calculated on their maximum dividends with a considerable addition for compulsory purchase. This was the principle on which the sum to be paid to the London water companies was calculated a few years ago, when it was proposed to purchase them; but the total price was so large, that the public recoiled from the bargain, and it was not effected. They assert now that if their property is taken without being paid for on this principle, it will be confiscated; and that the Bills brought into Parliament this year for the purpose of revising their charges, are really brought in for the purpose of carrying out a scheme of confiscation without avowing it openly. So far their defence has been successful, and they have preserved their rights intact. But the cry that the rights of property are assailed is not always successful with Parliament and may not always avail to protect the water companies. We should be the last to support any scheme, which proposed without compensation to deprive them of any rights which Parliament has given, and if any Bill for revising the system of charges is brought forward, its clauses should be carefully considered so as to prevent injustice being done to either company or consumer. The present system by which private bodies of traders are allowed practically to impose taxes on householders and to make a profit for themselves out of the supply of one of the first necessaries of civilised existence is, however, unsound in principle, and the sooner a fair arrangement can be made by which it shall be put an end to, the better for all parties.

Hints on Sanitary Law. By George F. Chambers, F.R.A.S. National Health Society, 44 Berners Street.

THIS little publication, which has just been brought out under the auspices of the National Health Society, is, as the author states, intended 'to bring home to unlegal minds and eyes what are with respect to public health matters in the metropolis the powers conferred and the responsibilities imposed by the laws of England on individuals as such, rather than on corporate bodies.' The number of statutes bearing on the subject of public health is so large, and their provisions are so complex, that even lawyers, and those whose duty it is to carry the Acts into effect, are often at a loss to know exactly what they may do under them. The ordinary lay reader generally gives up the task of attempting to understand them as hopeless. The difficulty, which applies to England at large, applies with even greater force to the metropolis; for whereas a fairly complete attempt at codification of the general law of public health has been made for England generally by the Public Health Act, 1875, London is excepted from its provisions, and is partly subject to various Acts which elsewhere have been repealed. Mr. Chambers attempts by the little work now before us to give the ordinary lay reader an idea of the general scope of the laws applicable to the metropolis. The task, as we have seen, is not an easy one, but, as far as he has gone, Mr. Chambers seems to have been successful. His work professes to bring before the reader in an encyclopædic form a popular outline of the chief subjects affecting health, which are included in the scope of any Act of Parliament applicable to London. This is done in the shape of a series of paragraphs, in which various subjects more or less connected with health are treated of very shortly. The different headings follow each other in alphabetical order; and, as far as it goes, the information given is fairly correct. But the work seems to us to have been so abbreviated as to be more likely to serve as an index to those who already know something of the law than as a trustworthy guide to those who know nothing of it. Its faults are those of omission rather than of commission, but it certainly seems to us that Mr. Chambers has erred on the side of being too concise. For instance, under the head of artisans' and labourers' dwellings, he says: 'This subject is not one which can be advantageously discussed in these pages, because action can only be taken by public authorities.' His datum is true enough, but we think some hint might well have been given as to the powers which individual ratepayers possess of putting the public authorities in motion, where they are inclined to neglect their duties. If the work had been a little fuller it would have been more useful, but we welcome it as being an addition to the means already existing of bringing home to the non-legal portion of the community a knowledge of the laws affecting health, with which everyone ought to be acquainted.

Memorandum. The Grand Junction Water Company.

A PAMPHLET bearing the above title has been issued, and we believe circulated extensively among those who derive their water supply from the Grand Junction Company, pointing out the ways in which that company is seeking to make up for the reduction of charge consequent on Dobbs's case, by increased charges in other directions. Under their Act the company's charges for water supplied for 'domestic use' are based on the annual value of the premises supplied; but water supplied for stables, gardens, special flushing of drains, and certain other matters, is not included in the term 'supply for domestic use,' and has to be paid for separately. Water for these purposes is to be paid for *by agreement*, and the company apparently have interpreted this phrase as meaning that they are entitled to make arbitrary charges, based on no fixed scale, for water which is not included in the supply for domestic purposes. That this charge is quite unauthorised is pointed out by the pamphlet in question; and means are suggested for arriving at what is a fair sum to agree upon in different cases. They are based on an estimate of what is an average quantity of water consumed for baths, where the charge is fixed by Act of Parliament, and by assuming that the same sum would be fair for water used in other ways. Where the quantity of water consumed can be approximately calculated, this way of arriving at the sum to be paid for it seems equitable enough, but we fancy that the consumer and the company would often have very different ideas as to the quantity consumed. The pamphlet in question seems likely to be useful to those who live within the district of the Grand Junction Company, and to payers of water-rates elsewhere when the charges for special supply are brought in question.

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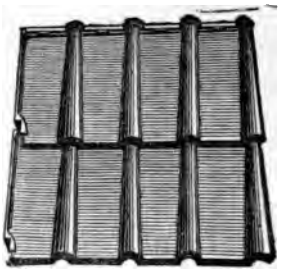
NEW INVENTIONS.

MAJOR'S PATENT NON-ABSORBENT ROOFING TILES.

In the March number of the SANITARY RECORD, in an article upon roofing materials, mention was made of a 'lock-jaw' tile. Since then the attention of the writer of this notice has been called to a new patent, the invention of Messrs. H. J. and C. Major, of Bridgwater, and he has recently had an opportunity of seeing the tiles in question both in process of manufacture, and in their finished state and fixed on roofing. The patent in question appears to possess advantages of no mean order. Bridgwater has justly been termed the home of the roofing tile industry, and it is a well known fact that the shapes and patterns there made are manufactured in other parts of the kingdom, often of inferior quality, and called Bridgwater tiles, simply because they are Bridgwater patterns, a compliment of rather doubtful advantage to the makers of the Somersetshire town. The clay found in these districts, though very uninviting when seen on the beaches of the adjacent watering places, is, nevertheless, a valuable commercial commodity, and is specially adapted for the purposes in question. Of a bluish-grey colour in its natural state, when worked up and dried, it assumes a whitish-brown colour, and when fired comes out a pleasing red. Referring to the patent tiles, of which engravings both of a single tile and their appearance when laid are appended; the patent is adapted to all Bridgwater tiles, the object of the



patentees being to render nailing down unnecessary, and, what is of more importance from a sanitary point of view, to prevent rain, snow, or wind from finding its way into the building, and to make the tile non-absorbent. To attain the latter object, each tile is subjected to a pressure of 60 tons, in a press containing a steel die, from which the pattern is also impressed on the clay. This process binds the atoms together in such an impenetrable mass as to render the tiles practically non-absorbent, consequently the water runs off rapidly; and the weight of the woodwork of the roof is a known and fixed quantity, instead of increasing with every shower. The patent tiles have no cut or unprotected corners as in ordinary ones, but each is secured from leakage by the formation of a 'rib' or 'web' across the face of the upper or top end, and a corresponding one underneath the lower end. There is also a secure lap at the side joint, formed by the edge of the tile dropping into a channel (in which is contained another 'rib') made to receive it on the other, so that every part is amply protected; and a close examination convinced us that it is next to impossible for rain, snow, or wind to penetrate the interior of the roof, and the patented improvement does not interfere with the rolls or corrugations, which are continuous, as in ordinary ones. The cost of these tiles is only slightly in excess of common ones per 100 square feet, as seventy-five of the patent ones will cover *securely* as much space as eighty-five of the common ones *indifferently*, however well laid. This presents economy in tiles of nearly 12 per cent., and a proportionate saving in cost of timber for constructing the roof, while the rapidity with which they are laid and the impossibility of doing this imperfectly means a great saving in labour and expense. One other feature in connection with these tiles is worth mentioning. A roof must be properly prepared as regards the laying of the timber to receive them. This prevents carelessness on the part of the workman, or, in plain language, 'scamping' the work—an object of great importance in these days of 'jerry' building. Messrs. Major's works have been established for nearly 250 years, and cover a ground area of nearly 60 acres. The sheds contain no less than 40 miles of shelving, on which the various articles made, consisting of different kinds of tiles, finials, &c., are placed for drying. Beyond the various kinds of tiles, chimney pots and land drainage pipes are manufactured here in large quantities, and bricks to an enormous extent. In the better qualities of bricks the firm can compete with London makers, notwithstanding the high rate of carriage to which they are subjected. Although this precludes the commoner sorts from being sent here, they are infinitely superior to those made in the metropolitan area, and it is satisfactory to find that the commonest class of dwellings around their district can be built of a sound and good material. It may not be generally known that the *real* Bath brick, which enters into the cleaning necessaries of nearly every house, is exclusively manufactured here, Bridgwater supplying the whole world. The Messrs. Major, who are the largest makers, turn out from ten to twelve millions annually, of which a large quantity are sent to Germany for the use of the army. On their arrival at the military depots, each brick is sawn up into small squares, and every soldier receives one of these to assist in cleaning some of his accoutrements, its clean and compact character being considered of great value. Do the soldiers of the Fatherland know to whom they are indebted for this useful abstergent? Messrs. Major are amongst the exhibitors at the International Health Exhibition.

SANITARY PAINTS.

It is confidently asserted by those connected with the manufacture of paints, who are best able to judge, and who are desirous to keep up the quality of their productions to an average standard; that there is no article used in connection with our houses in which so much adulteration, or, more properly speaking, imposition, is practised as in paint. It is said that so long as a material is mixed with oil, little heed is given to the other component parts. In most instances these paints are used for the cheaper class of dwelling, the consequence being that dissatisfaction ensues almost as quickly as the so-called paint dries. But in many instances these counterfeits are used in work done by contract of a superior order, or where the very best should be used, this state of things being brought about by excessive competition, and the desire of certain firms to outstrip their opponents in the race. It is therefore satisfactory to find that there are firms who refuse to lend themselves to such practices, and who send out an article that may be depended upon. In this category may be placed the Torbay Paint Company (proprietors,

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Stevens & Co.), of Brixham, Devon, whose offices are at 28 Billiter Street, E.C. This company possess a specialty of great value in their Torbay oxide paint, which enables them to obtain a price not commanded by every maker. This company, who have been established about thirty years, and whose productions were first introduced as Calley's Torbay Paints, must not be confused with any firm of a somewhat similar name. It may be well here to state that these paints received the name of Torbay from the fact that the oxide is from mines at Brixham; hence the name 'Torbay Paint.' It is not the first time that some of the valuable products found in the Devonian formation have been mentioned in these columns, and the one in question deserves especial remark. The natural colour of this Torbay oxide, as taken from the mines, is known in the trade as Spanish brown. This oxide is found at a short distance from the surface on the freehold property of the company, which embraces a considerable area, and is generally deposited in basins or 'pockets,' of which limestone rock forms the outer portion or crust. In other cases, while surrounded by the same rock, the depth appears to be almost illimitable, for, although worked for many years, no appearance of a falling off in the supply can be traced, and the company consider they still possess an inexhaustible quantity. This oxide is a natural combination of oxide of iron with silica, alumina, and a trace of magnesia, but no sulphur. The writer can testify from personal knowledge that no pyrites or chalks enter into the composition. There is no white lead on the premises; neither is it required, and even sugar of lead generally used in dryers is here altogether discarded. Where in ordinary paints white lead forms the basis, the Torbay oxide takes its place in these compounds. Torbay paint is decidedly a sanitary paint, possessing valuable qualities; and it is further claimed that a room painted with it may be slept in the same night, with perfect safety. While equally applicable to iron, wood, or stone, this paint appears to have an especial affinity for the former, by entering readily into its most minute pores, and it is asserted that one hundred-weight will cover as much space as double the quantity of any other oxide paint, and will last twice or thrice as long. As a proof of this, the company point to that great engineering work of the late Sir Isambard Brunel, the Saltash railway bridge at Devonport, which, after being painted with their production, required no further coating for ten years, a clear proof of its ability to stand severe weather, and not to wear off, while at the present time many of the largest iron bridges and viaducts are coated with it. So far as the variety of colours is concerned, the number that can be produced by the admixture of the primary colours alone with the Torbay oxide, is astonishing, and out of about seventy that appear on the cards sent out by the company, not more than half-a-dozen, consisting of whites and pale fancy shades, are deficient in the special feature above named. Fully alive, however, to the demand for a sanitary white paint, Mr. Stevens, the manufacturing partner of the firm, and an experienced chemist, has latterly been making experiments with a view to place such a paint in the market. We had an opportunity of seeing several specimens of this, both 'flattened' and with a gloss, and can testify to its admirable appearance. Mr. Stevens is very confident that this innocuous white paint will surpass anything that has yet been introduced of its character, and that it will retain its colour as long as there is any left of it, which will be another step towards the elimination of white lead from paints. Besides the paints, the company manufacture a composition for ships' bottoms, which has stood very severe tests; and they have recently added a superior oak colour varnish stain, which, applied to deal floors, gives them the appearance of old polished oak, and which is being extensively used.

A NEW DAIRY COMPANY.

THE inhabitants of South London have now the great advantage of obtaining pure milk, cream, and butter, since, some three months ago, the South Metropolitan Dairy Company commenced business at the Grand Promenade, Brixton Road. The company has been formed on a similar basis to that of the Aylesbury and other dairy companies, in order to supply the public with pure milk, cream and butter at the lowest possible price consistent with a fair commercial profit, and residents in the neighbourhood bear testimony that the articles supplied are of the most satisfactory character. A recent opportunity of inspecting the establishment gave a similar impression to the writer.

The company does not claim to have introduced any novelty into their undertaking, but to have based their operations upon the strictest sanitary principles. A very complete system of drainage has been carried out, and the drains themselves have been removed to a thoroughfare at the back of the premises, to which all waste is carried by drain-pipes, fitted with approved traps. Scrupulous cleanliness is everywhere apparent, and not the slightest unpleasant odour is perceptible. The company draw their supply of milk from some of the richest pasture lands in Surrey. We are not aware what is the system of sanitary inspection at the farms, nor the system of milk testing to prevent frauds by the employés at the farm and in London, nor how the health of farm servants and London carriers is secured; all essential points in the security of a milk supply. A steam-engine provides the motive power, and Laval's cream separator is brought into requisition for rapidly providing cream, the skim milk left from this operation finding a ready sale in the immediate neighbourhood. Cloited cream in the Devonshire fashion is daily made, and finds a quick sale. 'Lawrence's' refrigerators, and Hathaway's (of Chi penham) churns for making butter, of which the company make a large quantity daily, are used, so that it is evident they avail themselves of some of the newest and best known dairy appliances. All the utensils employed in the different processes are cleansed by steam, a range of piping with jets being laid down, each can being turned bottom upwards over one of these, and the steam turned on for a certain time. Lightly-built carts with fast trotting horses deliver the different products twice a day within a radius of some miles. The front portion of the premises is devoted to the retail over-counter trade, and is fitted up in a tasteful manner, and being lit with the electric light at night, the temperature of the shop is kept within the required limits.

CORRESPONDENCE.

[All communications must bear the signature of the writer, not necessarily for publication.]

ARTIFICIAL HUMAN MILK.

Our attention has been called to an article in your issue of Feb. 15, by Mr. D. Clarke, on the processes introduced by ourselves for the manufacture of 'Artificial Human Milk.' We shall be obliged if you will give us space in your valuable journal for a few remarks on this subject. The statement contained in an editorial note at foot of Mr. Clarke's letter, to the effect that 'Artificial Human Milk is largely manufactured by the Aylesbury Dairy Company,' may be understood by some of your readers to imply that this company is producing this article by our patented process. We beg to state that this is not the case. Whether the important problem of producing artificially a fluid exactly resembling human milk in its chemical properties and in its practical use, can be solved in several ways, and whether the Aylesbury Dairy Company has accomplished the same result by a process different from that which we have patented,

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experience will, in the long run, prove. But we consider it an established fact that, at least in Germany, no other preparation has been discovered which can compare with our own as a substitute for the natural food of infants, either in its close chemical similarity to the milk of the human mother, or in the value of the results attending its use in cases where children cannot, or may not, be reared on their natural food.

The process employed by the Aylesbury Dairy Company is a secret one; but the one which we patented Dec. 28, 1881 [English patent, No. 5697], and which is thereby made public, has been admitted by the highest authorities on the important subject of infant alimentation to be a most perfect combination of processes for the achievement of the object in view, and we may say that we believe that this object has been accomplished as completely as is possible, by reason of our having taken advantage, down to the minutest detail, of all the most recent developments of physiological chemistry.

The result of our daily experience, wherever our preparation has been introduced, is that, so far as the healthy growth and development of the child is concerned, no difference whatever is discoverable between the use of the natural food and of our imitation of it, a fact which receives confirmation from the large and constant increase which we experience in the demand for it. We venture to think that when our patent has been taken up by some enterprising capitalist in England, and introduced into all its larger towns, our product will attain equal popularity by reason of its sterling merit, and will come to be hailed as a boon in thousands of homes where the question of sustaining the life of its little ones who are deprived of their natural food, is a subject of deep anxiety, and that your correspondent, Mr. Clarke, will then have earned the thanks of many a grateful parent for having directed attention to an invention which derives no slight value from its bearing on a subject of what we may term 'politico-social' importance.

Altona. VOLTMER & Co.

ÆOLUS WATERSPRAY AND GENERAL VENTILATING COMPANY.

In reply to numerous inquiries will you kindly permit me to state through the medium of your columns that we are not exhibiting at the International Health Exhibition. We made application for space in the usual form, but having no less than seven patented inventions to exhibit, and amongst them an entirely new invention for the purpose of drawing off the vitiated air from infectious disease hospitals and destroying the disease germs, so as to render innocuous the presence of infectious disease hospitals in crowded neighbourhoods, we were compelled to ask for a considerable space. The allotment offered to us, 13 feet by 4½ feet, was totally inadequate for our purpose, and we were obliged to decline it. It has been alleged that the space at the disposal of the executive committee was insufficient to meet the demands of the exhibitors, but we think that when it comes to be seen how much space has been lavished on exhibits of secondary importance, this plea will scarcely suffice as an excuse for crowding out subjects of first interest in connection with the objects of the Exhibition, and we happen to know of at least one exhibitor, whose exhibits are certainly not of paramount importance, but yet who has been allotted twice as much space as he applied for. Our sole connection with the International Health Exhibition, therefore, is that we have undertaken the ventilation of the Vegetarian Restaurant, at the request of the Vegetarian Society, and we have no doubt that the purity of the atmosphere in that room will favourably contrast with the other dining establishments in the Exhibition.

I remain, your obedient servant,

235 High Holborn. R. OAKLEY,

Sole responsible Licensee in Great Britain of the Æolus Waterspray and General Ventilating Company's Patents.

VENTILATION.

The letter from Mr. Thomson, C.E., on page 522, while containing some sensible remarks, has also not a few misleading assumptions and mistakes. He says—'We all know that all heated air will ascend.' Now, from my experience in ventilation, I beg to state that one of the lessons I have learned is that 'all heated air' will *not* ascend, and especially in many cases in the ventilating pipes intended for its ascension put into houses; and the cause of this is often due to the action of the aerial siphon consisting of the long leg of the chimney, when the fire is on, drawing the air down through the shorter and colder intended upcast ventilating pipes put in by Mr. Thomson and others to the ridge or elsewhere; this downward current of air being perhaps worse during calm cold weather, when neither Mr. Thomson's ridge ventilator nor the best wind-acting exhaust ventilator in the market is able to counteract the effect produced by the heated chimney.

Seeing, therefore, that said heated chimney has such a powerful siphon-action effect, I often take advantage of it in the ventilation of rooms without any chance of any particles of soot or smoke—far less of the 'volumes' Mr. Thomson may have seen in the style he knows of—coming into the room through the unseen outlet ventilating-tube which I put in from the cornice down to nine inches or so from the floor, where it enters in at the back of the grate, and so allows the hot air near the ceiling to be carried off sometimes at the speed of 500 lineal feet a minute. In connection with this I often use Crossley's Balance Valve, or some of the other chimney-breast self-closing valves may be used. This plan works when the fire is on, and often when, I consider (as explained above), Mr. Thomson's plan would be useless. When the fire is off, another Crossley's valve may be opened under the cornice, leading direct into the vent or other means of ventilation used.

Mr. Ernest Turner, F.R.I.B.A., in his 'Hints to Househunters and Householders,' recommends a duct or pipe being led into the chimney with an anti-back-draught valve on it for the ventilation of rooms.

I think I have said sufficient to prove that Mr. Thomson's plan is not so perfect as he asserts, and I should like to hear a sensible reply to what I have said above from some of the manufacturers Mr. Thomson mentions as being capable of giving an opinion, only I hope they will not refer to 'pump barrels' in this connection.

As to ventilating 'excrescences,' it would be a question of taste with many whether Mr. Thomson's ventilating ridge, which may do very well for some manufacturing works, would not be a greater excrescence upon their building than 'Buchan's or Boyle's' ventilators; while for many purposes, leaving Mr. Boyle to speak for himself, I imagine Buchan's exhaust ventilator would often be found to be sucking up when the ventilating ridge would be allowing down draught, and further, so long as architects use such 'excrescences or eruptions' as steeples, towers, and turrets, so long are they likely to use such exhaust ventilators as Buchan's, or any other such that may take their fancy; only in justice to their clients they should use whatever ventilator really serves the purpose it is put up for best.

It is not the fact, as stated by Mr. Thomson, that 'architects now object to such excrescences as Buchan's, Boyle's, and similar eruptions on roofs,' for since Mr. Thomson wrote his letter I have had orders from architects for my 'eruptions,' and more are coming, and only a few weeks since Messrs. John Melvin & Son, architects, Alloa, wrote: 'The two 27 inch, No. 7, ventilators you supplied to our order about eighteen months ago . . . are the best design of roof ventilators we have yet seen, and we understand they have worked well.'

In conclusion, I beg to observe that when consulted about ventilating a place I do not cry up my own appliances as the infallible cure for everything, but recom-

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mend what I consider will be best under the circumstances. W. P. BUCHAN.

21 Renfrew Street, Glasgow.

'ARTERIAL DRAINAGE.'

I beg to sympathise with and to support the objections expressed by Sir George Airy, as explained on p. 497, against the use of the word 'arterial' in connection with descriptions of, or allusions to, our system of house drainage and sewerage.

Supposing newspapers and sanitarians have been mistakenly using the word, they should stop doing so when the error is pointed out, and especially so soon as an at least equally euphonious as well as more truly descriptive word is pointed out or invented to supply its place. I cannot say I like the word 'venous': it seems to me rather *bloody*, and the 'ous,' or *full of*, too suggestive of *choked* drains, hence I would prefer the affix 'al,' and humbly propose *veintral*, but perhaps Sir George or some other scholar could suggest a better word than any yet mentioned. W. P. BUCHAN.

21 Renfrew Street, Glasgow.

COSTLESS VENTILATION.

SIR,—At page 488 of your April number in the 'Hints to Sanitary Inspectors,' Section 41, Practical Hints on Ventilation, is the following passage:—'With regard to the admission of fresh air by *inlets*, a window can be made a tolerably perfect inlet-ventilator by the method invented by Mr. Hinckes-Bird in 1862, and simultaneously by Sir Robert Rawlinson.' Under the title of 'Costless Ventilation' a notice appeared in the *Builder* of March 2, 1862, in which I described the plan I had for some time used of admitting air at the meeting-rails of the window. I shall esteem it a favour if the author of these 'Hints' will inform me when the simultaneous description by Sir Robert Rawlinson appeared, as I must confess, until now, I have never heard of it.

Kyrenia, Cyprus. P. HINCKES-BIRD.
May 3.

THE SANITARY USE OF PERFUMES.

You publish in your last issue an article by Mr. Kingzett headed 'The Sanitary Use of Perfumes.' Will you allow me to offer the following remarks in reply to the strictures passed by the learned professor on the lecture I delivered under that name.

The two main points on which he declares me to be wrong, viz., that the 'Aromatic Ozonizer' evolves ozone, and that toilet waters can be rendered ozonic by the admixture of peroxide of hydrogen, were stated by me not on my own authority but on that of scientific men.

Dr. Hassall, in his analytical report of my 'Aromatic Ozoniser,' says: 'I have readily succeeded in detecting ozone in the air of a room in which Mr. Rimmel's preparation had been exposed.'

Dr Day, of Geelong, at whose suggestion I compounded the series of 'Ozonised Toilet Waters,' wrote me: 'In manufacturing and making known the hygienic value of oxygenated perfumery, you will be conferring a great benefit on the public, for it is the best means of disinfecting bedrooms, closets, &c.'

Practice has since abundantly confirmed the truth of these theories; and, after all, that is the best test.

In conclusion, my aim has been to offer to the public an agreeable deodoriser, and the Professor confesses himself that 'turpentine' does not smell quite so pleasantly as the 'mixture of essences' I employ for that purpose. Indeed, it will be generally admitted that turpentine emits a most disagreeable odour, particularly irritating to nervous or sick people, and I see no advantage in replacing one bad smell by another. E. RIMMEL.

SANITARY JOTTINGS.

SANITARY.

FORD BANK, Didsbury, the residence of Thomas Ashton, Esq., J.P., the late High Sheriff for the county of Lancaster, is now undergoing a complete remodelling of its sanitary arrangements. The old drains are being taken out, and a system of complete and continuous ventilation for the new is being adopted. The work is being done by Mr. Ashton's own workmen, under the instructions of Messrs. Morrison, Ingram, & Co., sanitary engineers, who have prepared the plans for the scheme.

A new disinfectant is mentioned in the *Centralbl. für die Gesam. Therapie*, Feb. 1884, under the name of bromum solidificatum (solidified bromine). It consists of 75 per cent. of bromine made up into pastilles of 20 grammes (two-thirds of an ounce each), every such one being sufficient to disinfect an area of 130 cubic feet with its contents. The disinfectant must occupy an elevated position in the room, and should be left there for from four to six hours, after which the windows may be thrown open.

At the last meeting of the Wallsend Local Board a complaint was read from Mr. Mordue, who stated that the stench arising from an incomplete drain running past his garden was becoming unbearable; he threatened to communicate with the Local Government Board if the matter was not attended to. One of the members present stated that the Local Government Board were to blame in this case by delaying the loan which had been applied for to complete the drain in question.

At some of the inquests recently held on the bodies of persons drowned in the river Tyne, attention has been drawn by the jury to the desirability of erecting mortuaries in convenient situations on the banks of the Tyne.

At a recent meeting of the Bishop Auckland Local Board, it was reported that the committee had agreed that a central hospital for infectious diseases be erected at a cost not exceeding 1,250*l.*

M. Sauvageon, of Valence, has studied the different phenomena which are produced in a cup of coffee when the sugar is put into it, and the results of his observations transform it into a barometer. 'If, in sweetening your coffee,' says M. Sauvageon, 'you allow the sugar to dissolve without stirring the liquid, the globules of air contained in the sugar will rise to the surface of the liquid. If these globules form a frothy mass, remaining in the centre of the cup, it is an indication of duration of fine weather; if, on the contrary, the froth forms a ring round the sides of the cup, it is a sign of heavy rain; variable weather is implied by the froth remaining stationary, but not exactly in the centre.'

WATER SUPPLY.

AT the annual general meeting of the Antwerp Waterworks Company (Limited) Mr. Edward Horner presided, and, in moving the adoption of the report, stated that the substance of the accounts was that there was no dividend to be declared. The business of the concern was still progressing, and the estimated rental, which last year was 6,000*l.*, which was exceeded by between 500*l.* and 600*l.*, was estimated for the current year at 8,300*l.* They had also made a contract with the municipality which would produce them about 1,000*l.*, and if they had the same percentage of increase as they had last year in other parts of their revenue, the total receipts for this year would be about 10,000*l.* The loss on the working of 1882 was 543*l.*, while on the past year there had been a loss of only

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12*l.* With a very large increase of revenue there would be only a trifling increase in the expenses. As to the filtering by Bischoff's spongy iron, which had been a matter of some doubt among scientific men, he believed this company had proved it to be a complete success, and complaints scarcely ever arose now as to the quality of the water supplied by them.

LEGAL.

WATER COMPANIES' CHARGES.—On the 6th inst., at the adjourned audit of the accounts of the Acton Local Board for the past year, Mr. Bertram F. Hartshorne, the district auditor of the local Government Board, dealt with an exception taken by Mr. H. A. Lewsey and Mr. J. P. Hope, two ratepayers, to the payment by the Board of 9*d.* per 1,000 gallons charged by the Grand Junction Waterworks Company for watering the public roads, on the ground that the Company's Act did not allow the company to charge more than 6*d.* per 1,000 gallons, where, as in this case, the quantity consumed was more than 200,000 gallons. On behalf of the Board, it was submitted that the clause referred to regulated the supply for domestic purposes only, and that water for public roads did not come within that definition, and that under the 49th section of the company's Act they were entitled to supply 'water for other than domestic purposes at such rate and upon such terms and conditions as shall be agreed upon between the company and the person or body requiring such supply.' The auditor, while dissenting from the view of the opponents of the payment, disallowed the amount on the ground that the supply was of the nature of a contract and for a sum exceeding 50*l.*, and therefore, in accordance with the 174th section of the Public Health Act, should have borne the seal of the Board. He also disallowed the sum of 31*l.* 10*s.* for meters and standposts, on the ground that the company's Act gave them no power to make such a charge.

WE regret to announce the decease of Mr. B. Giles, F.R.S.A., F.A.S., sanitary and hot-water engineer, of Blackheath and Eltham, whose funeral took place on May 1 at St. John the Baptist (parish church), Eltham. The late Mr. Giles had much scientific and inventive genius, and patented many useful inventions. His name will be remembered in connection with the International Fisheries Exhibition of 1883, in which his apparatus materially tended to the success of the cheap fish dinners for the million; and also in connection with the great International Health Exhibition now open at South Kensington, to which he contributed a very large and meritorious display of gas, hot water, and heating apparatus.

SANITARY ASSURANCE ASSOCIATION.—At a meeting of the Council of this association, at 5 Argyll Place, Regent Street, W., on Monday, May 12, Sir Joseph Fayrer, F.R.S., in the chair, a discussion took place on the International Health Exhibition in connection with a letter from Mr. H. Rutherford, of the Temple, and on the motion of the chairman, seconded by Lieut.-Gen. Burne, C.B, it was resolved 'that the medical officer, Dr. James Stevenson, and the sanitary surveyor, Mr. Mark H. Judge, A.R.I.B.A., be instructed to visit the various departments of the Health Exhibition connected with the drainage and water supply of dwelling-houses, for the purpose of reporting on the same to the council and members of the association.' The following resolution was also passed, on the motion of Mr. Barrington Kennett, seconded by Mr. Mark H. Judge, that certificates be given to builders and plumbers who, having executed sanitary works under the direction and supervision of the association, have completed the same to the satisfaction of the medical officer and the sanitary surveyor.' At the same meeting it was decided to inspect and certify the sanitary condition of hotels of moderate size in any part of England on the same terms as private houses.

THE HOUSING OF THE POOR.

AUSTRALIAN 'SLUMS' AND THEIR CURE.—Mr. R. Adams, of Sydney, writes to a daily contemporary:—Even in these young colonies the curse of unwholesome dwellings and 'back slums' has not been wholly escaped from, but the citizens having awakened, however tardily, to the danger of them, both morally and physically, a short Bill was passed by the New South Wales Legislature some few years back, empowering the Mayor of Sydney to order the demolition of any old, dilapidated, or unhealthy dwelling within the city bounds, the proprietor thereof having to demolish it at his own expense and risk, and receiving no compensation therefor.

The result has been, that in a city of about 150,000 inhabitants (the suburbs with their other 100,000 not being included) since November 1879 to November 1883—four years only—no less than 1,300 buildings have been thus condemned and razed, and in their place have been erected 3,719 new stores and dwellings, which, built as one building (*i.e.* leaving out yard space) would cover 67 acres of ground; and, in addition to this, the Act gives power to compel warehouses, shops, factories, &c., to have proper sanitary appliances, and sufficient ventilation provided by the owners thereof (at their own expense).

There has been no real opposition to the Act, it appears, and the city has, so far, been beautified and sanitated, and the shopkeeper has a better shop, and his neighbour, the artisan, a pleasant dwelling, at much the same cost as before (when tenants); while to meet the exodus of those who prefer the 'suburbs and a garden,' there are the Government tramways, which radiate from the centre of the city, south and west, to the very verge of the country, for a fare of 2*d.* only, running from 5·30 A.M. till 12.20 midnight, and paying handsomely as a mere investment.

HOMES FOR ARTISANS.—A new block of buildings, forming two houses, has just been erected in William Street, Blackfriars, by the Trustees of Brown's Estate, for the accommodation of artisans. They have been constructed so that two rooms may be let out together, or a single room if required, with a general washhouse in the basement. The ground at the back being at a much lower level than in front, abundance of air and light is obtained. Each set of rooms on the upper floor is furnished with sinks and small larders, well lighted and ventilated, and shut off from the room. A good coal-store is attached to each set of rooms; all parlours have a strong range with oven, and also a dresser; other rooms have large hanging cupboards. The houses have been built in a simple but substantial manner, and special attention has been given to the consideration of two vital points in the construction of this class of property, viz., to guard as far as possible against the damage and destruction of the rooms, and to prevent the accumulation of vermin. The walls are of stock bricks with Brown's red bricks to cornices, strings, and panels of front; the doorways having jambs and arches in tinted glazed bricks. A very efficient damp course has been formed with Dussek's patent damp-proof bricks, the joints filled in with his impervious cement. The whole of the internal partitions are brick-nogged. The whole of the plastering is executed in selenitic cement, finished down to floor behind skirtings. A chamfered deal chair-rail, 6 in. wide, is run round all the walls, which is a great saving thereto, and a very sensible arrangement. All sashes are double hung with Garner's patent catgut sash-lines. The locks and furniture are Kaye's patent. All woodwork is grained and varnished, and the dados are papered and varnished. A ventilator is provided over each door from passage. The water-closets are supplied with syphon waste-preventing cisterns, and the drains are arranged with inspection openings so as to examine them with ease in case of any stoppage. A gateway has been formed under one house for access to a large engineer's workshop at back, known as Artois Works, where the well-known and

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very old-established firm of Mr. W. Speller carries on the manufacture of hydraulic pumps, &c. The works have been carried out in a highly satisfactory manner by Mr. J. B. Axford, builder, of 4A Henry Street, Gray's Inn Road, from the designs and under the superintendence of Mr. W. Hewson Lees, of 27 Doughty Street, Mecklenburgh Square, W.C.

HOUSING OF THE POOR AT CAMBORNE.—Mr. John Vivian, of the firm of Vivian and Brothers, drapers, Camborne, has been examined before the Royal Commissioners appointed to inquire into the dwellings of the poor. He gave evidence respecting the housing of the poor and the overcrowding in Camborne. Of some of the more ill-conditioned dwellings he produced photographs, and supplemented his statements with statistics as to the accommodation afforded. Mr. Vivian largely attributed the defective state of many of the dwellings to the operation of the three-life lease system, which he strongly condemned; and referred the commissioners to the pamphlet entitled *The Bitter Cry of Cornish Leaseholders*, as illustrating how injuriously the system had worked in the Camborne district. See SANITARY RECORD, April 15, 1884, p. 496.

Model dwellings for 350 families are to be erected at Anglers Gardens, Essex Road, N. The work is to be commenced immediately.

Amongst those who have given evidence before the Royal Commission on Housing the Working Classes is Mr. John Price, Resident Director of the Newcastle Improved Industrial Dwellings Company, a gentleman who has devoted much attention for many years to this important subject, on which he has been a valued contributor in this and other journals. Mr. Price's long residence amongst and intimate connection with the working classes has afforded him the advantage of a practical acquaintance with the question that is possessed by few writers on the subject.

PARKS AND OPEN SPACES.

FRESH AIR FOR AILING LONDON CHILDREN.—It may be remembered that nine years ago a scheme was started by the Rev. S. A. Barnett, vicar of St. Jude's, Whitechapel, to send poor children into the country on a visit of two or three weeks. The idea once known was copied in other parts of London, until last year some thousands were sent. Hitherto the work has been carried on by isolated individuals and local committees, who have collected funds and found cottagers who would take children on a payment of 5*s.* a week per child. In order to give the scheme a larger basis and to avoid overlapping of charitable efforts, it has this year been thought well to unite the different workers. The local committees agreed to work with a central committee, and a few simple rules were adopted, one of the principal being that the parents should contribute according to their means towards the expenses. The effect of the change would be greatly to increase the area of work and enlarge the expenditure. The scheme has received the support of the Bishops of London and Bedford, the Earls of Shaftesbury, Aberdeen, and Nelson, the Right Hon. A. J. Mundella, M.P., and Mr. Samuel Morley, M.P., the Dean of Llandaff, the Rev. Dr. Allon, Mr. Benson, Mr. Leonard Courtney, and Miss Davenport-Hill. Most of the large railways have promised to issue tickets at reduced rates to children sent by the committee; but further help, either of money or country homes, is much needed.

Subscriptions to 'The Country Holidays Fund, to Provide Fresh Air for Ailing London Children,' may be sent to the hon. treasurer, F. Greene, 3A King William Street, E.C., and additional information obtained from the secretary, at the office, 1 Adam Street, Adelphi, W.C.

As a practical contribution to the health of urban populations, nothing can be better than this plan of sending town children to gain health by the imbibing of pure air. The idea might be usefully adopted in Liverpool, Manchester, Glasgow, and in fact all large centres of population.

THE LATE HORSEMONGER LANE GAOL.—Mrs. Gladstone, on the 5th inst., opened as a playground for the children in the neighbourhood of Southwark a part of the site of the old Horsemonger Lane Gaol. The prison, which has been partly cleared, stood in a neighbourhood historically connected with prisons, and was erected in 1791 as the result of the labours of John Howard, the philanthropist, to relieve the overcrowding of other prisons. When the Government took in charge the duty of guarding the criminals, this gaol, as did others elsewhere, returned into the hands of the county justices, who proposed to sell the site, but, not obtaining the price they sought, they agreed to let it at a nominal rent to the beneficent association with which Lord Brabazon and Mr. Ernest Hart are prominently connected — the 'Metropolitan Public Garden, Boulevard, and Playground Association,' which is fitted up with gymnastic apparatus for the children. Mr. Leycester Penrhyn, the chairman of the Surrey Quarter Sessions, expressed his regret that it had not been possible to present the ground altogether as a place of recreation. The magistrates, however, did not feel warranted in giving for a particular locality land which had been purchased at the cost of the whole county, but all the magistrates could do to keep it an 'open space' for that crowded part of the metropolis would have their warm support. He then presented a gold key of the ground to Mrs. Gladstone, who, amid cheers, declared the ground open for the enjoyment of children. Lord Aberdeen then spoke of the great amount of good which the 'Playgrounds Association' had already done in its short existence, and expressed much regret that Lord Brabazon, who had ever shown a great sympathy with the needs of the crowded poor, should have been deprived by indisposition of the pleasure of being there on that occasion. Sir Robert Peel, M.P., said he hoped that the place which had witnessed so much sorrow would be one of happiness to many generations of children. A vote of thanks was passed to the Surrey magistrates.

LORD DERBY has promised to contribute 10,000*l.* towards the cost of a public park for Bury, in addition to leasing the ground at a nominal rent.

CREMATION NOTES.

THE New England Cremation Society was organised in Boston on March 11, an Act of Incorporation having been granted not long since. By-laws were adopted and officers chosen. The fee for membership, 1·50 dollars per month, or 12 dollars in one annual payment, insures each member cremation, the only other cost being the delivery of the remains to the crematory. The society in this city was organised under the clause whereby societies 'religious, scientifical, and medical,' can issue stock at 25 dollars per share. The capital stock of the company is to be 25,000 dollars, and it is the intention to establish a crematory at the earliest opportunity. A site had already been determined on in the suburbs of the city, and situated in most attractive surroundings. Some four acres of land will be, it is understood, taken for the purpose, and will be laid out in a becoming manner. A handsome building will be constructed containing a chapel, where religious exercises may be held while the body is being incinerated in the retort below. The plan also contemplates a room for autopsies, and others for the keeping of bodies a certain length of time. This latter provision is with the view of easing the minds of those who might wish for cremation, but who have a dread of either being buried or burned alive. The society and its crematory will be open to all classes, irrespective of creed or colour; and any services at the chapel will be in accordance with the wishes of the relatives, but free of expense to the society. The crematory will be the sixth in the world;

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and it is understood that use will be made of the most advanced ideas already embodied in similar institutions at Gotha, Milan, London, and in Washington (Pennsylvania). The crematory of the Cremation Society of England is taken to be the most complete one extant. On April 9 140 pounds of a cow—hind-quarters with the largest bones—were reduced to ashes in less than an hour and a half, at an expense of only 6*s.* for fuel.

The Council of the Parkes Museum have decided to arrange in the museum a collection of models and illustrations of objects relating to cremation and improved forms of burial and disposal of the dead, as a supplement to the International Health Exhibition, this subject not being included in the classification of that exhibition. The Council will be very glad to receive offers of models, or other information, as they wish to make the collection fully representative of the latest and most approved plans and methods.

At Gotha, on Easter Day, the corpse of an American lady was cremated, this being the one hundred and sixty-third case of the kind since the establishment of the crematorium there.

EXHIBITIONS.

SANITARY INSTITUTE OF GREAT BRITAIN.

SANITARY EXHIBITION, 1884.

THIS Exhibition will include articles of domestic use and economy, and will be held in the Royal Dublin Society's Buildings, Balls Bridge, Dublin, from September 30 to October 18, 1884, in connection with the Seventh Autumn Congress of the Institute.

Applications for space must be made on the official form and under the proper class. They must be sent to Mr. E. L. Box, the Curator of the Exhibition, at the offices of the Institute, 74A Margaret Street, London, W., not later than Saturday, September 1, 1884. No application after this date will be received unless accompanied by an extra payment of 5*s.* per foot frontage.

Prize Medals and Certificates of Merit will be awarded at the discretion of the judges, and their decisions will in all cases be final. The List of Awards will be published in the Transactions of the Institute for 1884.

Protection in accordance with the Protection of Inventions Act, 1870, will be obtained from the Board of Trade for persons desirous of exhibiting New Inventions.

Forms of application for space and other particulars can be obtained of E. L. Box, Curator, 74A Margaret Street, London, W.

NOTICES OF MEETINGS.

SOCIETY OF MEDICAL OFFICERS OF HEALTH, 1 ADAM STREET, ADELPHI, LONDON.

SESSION 1883–84.

T. Orme Dudfield, M.D., President.

THE next meeting (being the last of the present session) will be held on Friday, May 16, at 7.30 P.M.

The minutes of the last meeting will be read.

The Council will present a report on—1. The alterations in the proposed Conferences in the Health Exhibition. 2. The question whether the makers of fish, fruit, and meat pies come within the scope of the Bakehouses Act.

Mr. H. Osborn, Medical Officer of Health of Southampton, proposed by Mr. Whitaker, Mr. Lovett, and Dr. Vinen will be balloted for as an Extra-Metropolitan Member. Dr Alfred Hill will read a paper on 'The Sanitary Supervision of Bakehouses, with especial reference to those of Birmingham.' Dr. G. Paddock Bate will make some observations on 'The Calculating Slide Rule as an assistant to the Medical Officer of Health in Mensuration and Statistics.'—J. NORTHCOTE VINEN, M.D., St. John's, Southwark, S.E. SHIRLEY F. MURPHY, 158 Camden Road, N.W., Honorary Secretaries.

THE PARKES MUSEUM.

AT a meeting of the Council on the 9th ult., Dr. G. N. Poore in the chair, the following gentlemen were elected members:—Right Hon. Sir Charles Dilke, Bart., M.P.; Sir Spencer Wells, Bart.; Sir Thomas H. Farrer; Sir Henry Thring, K.C.B.; Mr. W. Cornwallis Cartwright, M.P.; Mr. Francis Galton, F.R.S.; Dr. W. Roth, Surg.-General, Saxon Army; Mr. Octavius Hansard, F.R.I.B.A.; Mr. Arthur Cates, F.R.I.B.A.; Mr. Charles Barry, F.S.A.; Dr. Hubert Airy; Dr. C. E. Paget, M.O.H.; Mr. J. Douglas Matthews, F.R.I.B.A.; Mr. Ernest Turner, F.R.I.B.A.; Dr. G. D'Arcy Adams; Mr. Benjamin Baker, C.E.; Mr. Charles Hancock; Mr. Shadworth H. Hodgson; Mr. A. McMorran; and Mr. Monier Williams. During the past month there have been fifty one new members elected.

COMPETITIONS.

THE French Anti-Tobacco Society offers for competition this year a series of premiums varying from 100 frs. to 300 frs. for the best essays or papers against the use of tobacco. There are further prizes in the shape of medals and diplomas. The essays, which are to be sent in to the President, M. E. Decroix, at No. 38 Rue Jacob, may be written in English, French, or German. Detailed programmes of the competition are to be had on application at the foregoing address.

APPOINTMENTS UNDER THE PUBLIC HEALTH ACT.

MEDICAL OFFICERS OF HEALTH.

ADAMS, Joseph, M.B., C.M.Univ.Edin., L.S.A.Lond., has been appointed Medical Officer of Health for the Runcorn Rural Sanitary District, Cheshire, at £120 per annum, *vice* Bride, resigned.

APPLEBE, Edward Alexander, L.R.C.P.Edin. and L.M., L.F.P.S. Glasg., has been appointed Medical Officer of Health for the Hay Rural Sanitary District, Brecknockshire, at £10 10*s.* for one year, *vice* Giles.

ASTON, John Pitney, L.S.A.Lond., has been re-appointed Medical Officer of Health for the Eccleshill Urban Sanitary District, Yorkshire, at £40 per annum for three years.

BULLMORE, William King, M.D.Univ.St.And., M.R.C.S.Eng., has been appointed Medical Officer of Health for the Falmouth Division of the Falmouth and Truro Port Sanitary District, at £50 for one year.

DABBS, George Henry Roqué, M.D.Univ.Aberd., M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Shanklin Urban Sanitary District, at £30 for one year, *vice* Woodford, whose appointment has expired.

CARSON, Stewart, Junior, M.B., C.M.Univ.Edin., has been re-appointed Medical Officer of Health for the No. 1 Division of the Alston-with-Carrigill Rural Sanitary District, Cumberland, at £20 for one year.

DAWSON, Cautley, L.R.C.P.Lond., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Rawdon Urban Sanitary District, Yorkshire, at £12 for one year.

COUCH, John Quiller, M.R.C.S.Eng. and L.M., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Madron Urban Sanitary District, Cornwall, at £6 for one year.

FORSYTH, Robert, M.D.Univ. Glasg., has been re-appointed Medical Officer of Health for the Birkenshaw Urban Sanitary District, at £18 for one year, and for the Birstal Urban Sanitary District, at £25 for one year.

GUTTERIDGE, Edwin Parker, M.R.C.S.Edin. and L.M., L.S.A. Lond., has been re-appointed Medical Officer of Health for the Maldon Division of the Colchester Port Sanitary District, at £10 10*s.* for one year.

HASWELL, Narcis Richard, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Helston Rural Sanitary District, Cornwall, until Michaelmas next, at the rate of £100 per annum.

HICHENS, James Stacey, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Redruth Urban Sanitary District, Cornwall, at £15 15*s.* for one year.

HODGSON, Isaac Clark, M.B., C.M.Univ.Glasgow, has been re-appointed Medical Officer of Health for the Workington Port Sanitary District, at £5 for one year.

HOOPER, Charles, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Aylesbury Urban Sanitary District, at £70 for one year.

JACKSON, Henry, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Barnstaple Urban Sanitary District, at £40 per annum, *vice* Fernie, deceased.

JEFFERISS, Walter Robert Spence, M.D.Univ.Edin., L.R.C.P.Edin., L.R.C.S.Edin., has been appointed Medical Officer of Health for the No. 2 Division of the Alston-with-Carrigill Rural Sanitary District, at £20 for one year.

LLOYD, Kenrick Morton, M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Holywell Urban Sanitary District, at £10 10*s.* per annum, until March 25, 1885.

O'BRIEN, Daniel, L.R.C.P.Edin., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Northern Division of the Axminster Rural Sanitary District, at £25 for one year.

O'MEARA, Frederick Augustus, L.R.C.P.Edin., L.R.C.S.Edin., L.A.H.Dub., has been re-appointed Medical Officer of Health for the Southern Division of the Axminster Rural Sanitary District, at £25 for one year.

PARTRIDGE, Thomas, M.K.Q.C.P.Irel., M.R.C.S.Eng., L.S.A. Lond., has been re-appointed Medical Officer of Health for the Stroud Rural Sanitary District, at £110 for one year, for the Stroud Urban Sanitary District, at £90 per annum for three years, and for the Bisley Urban Sanitary District, at £15 for one year.

SHARP, Edward, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Truro Division of the Falmouth and Truro Port Sanitary District, at £10 for one year.

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STONEY, Percy Butler, L.R.C.P.Edin. and L.M., M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Millom Urban Sanitary District. Cumberland, at £40 for one year.

WALKER, John Davidson, L.R.C.P.Edin., L.R.C.S.Edin., has been re-appointed Medical Officer of Health for the Fylde Rural Sanitary District, Lancashire, at £60 for one year.

WATSON, John Wilcocks, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Whitwick Urban Sanitary District, Leicestershire, at £20 for one year, *vice* Donovan, resigned.

WOTHERSPOON, Thomas Allan, M.D.Univ.Edin., L.R.C.S.Edin., has been re-appointed Medical Officer of Health for the Brampton Rural Sanitary District, at £60 for one year.

WRIGHT, John Frederick, M.R.C.S.Eng., L.S.A.Lond., has been appointed Medical Officer of Health for the Alton Rural Sanitary District, at £80 per annum for three years, from July 1 next, *vice* the Poor-law District Medical Officers.

SURVEYORS, CLERKS TO GUARDIANS, INSPECTORS OF NUISANCES, &C.

AUSTIN, Mr. Jonathan, has been re-appointed Surveyor to the Denholme Gate Local Board and Urban Sanitary Authority, at £38 for one year

BARNICOAT, Mr. Charles, has been appointed Inspector of Nuisances for the Falmouth and Truro Port Sanitary District, at £10 for one year.

BOUND, Mr. William, has been appointed Inspector of Nuisances for the Thame Rural Sanitary District, at £90 per annum, *vice* Howland, resigned.

BROWN, Mr. William Luke, Banker, has been re-appointed Treasurer to the Denholme Gate Local Board and Urban Sanitary Authority, Yorkshire.

BURR, Mr. George, Solicitor, has been re-appointed Clerk to the Denholme Gate Local Board and Urban Sanitary Authority.

CLARKE, Mr. Joseph, has been elected a Member of the Tarporley Local Board and Urban Sanitary Authority, Cheshire, *vice* Daine, resigned.

COX, Mr. J., has been appointed Collector to the Burnham Local Board and Urban Sanitary Authority, at £23 10*s.* per annum, *vice* Marchant, deceased.

DAVIES, Mr. Fairfax, has been appointed Clerk to the Smallburgh Guardians and Rural Sanitary Authority, Norfolk, at £125 per annum; as Clerk to the Guardians, about £75 per annum; as Clerk to the Rural Sanitary Authority and the Assessment and School Attendance Committees, and fees as Superintendent Registrar of Births, &c., and Returning Officer, *vice* Bernard, resigned.

DAVIES, Mr. William A., has been appointed Surveyor to the Aston Manor Local Board and Urban Sanitary Authority, at £200 per annum, *vice* Brown, appointed to West Hartlepool.

DEBENHAM, Mr. James, has been appointed Treasurer to the Corporation and Urban Sanitary Authority of Godalming, *vice* his father deceased, who had held the office for forty-six years.

EDGAR, Mr. Robert, of the Halifax and Huddersfield Union Bank, has been appointed Treasurer to the Southowram Local Board and Urban Sanitary Authority, Yorkshire, *vice* Bowman, deceased.

EVANS, Mr. Edward Morris, has been re-appointed Inspector of Nuisances for the Holywell Urban Sanitary District, at £30 per annum, until March 25, 1885.

FORREST, Mr. W. C., has been elected a Member of the Rawdon Local Board and Urban Sanitary Authority, *vice* Barras, left the district.

HEATH, Mr. Richard Child. Solicitor, has been appointed Clerk to the Milverton Local Board and Urban Sanitary Authority, Warwickshire, at £75 per annum, *vice* Handley, resigned.

HOWARD, Mr. Harry, has been appointed Surveyor and Collector of Water Rents to the Littlehampton Local Board and Urban Sanitary Authority, at £70 per annum, and Inspector of Nuisances at £30 per annum, *vice* Dallimore.

HUNNYBUN, Mr. Gerald, Solicitor, has been appointed Town Clerk and Clerk to the Urban Sanitary Authority of Godmanchester, at £40 per annum, and Clerk to the Justices at £35 per annum, *vice* Mr. Martin Hunnybun (his father) deceased.

ISAAC, Mr. J. Swinton, Banker, has been appointed Treasurer to the Worcester Guardians and Rural Sanitary Authority, *vice* Mr. John Whitmore Isaac, his father, deceased.

JONES, Mr. William, has been re-appointed Inspector of Nuisances for the Dolgelly Urban Sanitary District, Merionethshire, at £15 for one year.

JOYCE, Mr. Thomas John, has been re-appointed Inspector of Nuisances for the Helston Rural Sanitary District, until Michaelmas next, at the rate of £21 per annum.

KENNET, Mr. W. B., has been appointed Treasurer, from June 24 next, to the Sandgate Local Board and Urban Sanitary Authority, at £10 10*s.* per annum, *vice* Dunnett, resigned.

KERSHAW, Mr. James, has been elected a Member of the Hebden-Bridge Local Board and Urban Sanitary Authority, *vice* Greenwood, resigned.

MALLINSON, Mr. Richard, has been elected a Member of the Rawdon Local Board and Urban Sanitary Authority, *vice* Tennant, resigned.

MARSHALL, Mr. William, has been re-appointed Surveyor, Inspector of Nuisances, and Collector to the Rawdon Local Board and Urban Sanitary Authority, at £80 for one year.

MAYNE, Mr. James, has been appointed Collector to the Aylesbury Local Board and Urban Sanitary Authority, at £45 per annum, *vice* Neale, resigned.

MCNAB, Mr. —, has been re-appointed Inspector of Nuisances for the Maldon Division of the Colchester Port Sanitary District, at £24 for one year.

MELLOWS, Mr. William, Solicitor, has been appointed Town Clerk, Clerk to the Urban Sanitary Authority, and Clerk to the School Attendance Committee, of Peterborough, at £300 per annum, *vice* Gaches, deceased.

MUSGRAVE, Mr. Clitsome, has been appointed Inspector of Nuisances for the Tiverton Rural Sanitary District, at £40 per annum, *vice* Bolt, resigned.

NEWTON, Mr. James, has been re-appointed Inspector of Nuisances for the Madron Urban Sanitary District, at £8 for one year.

NOWELL, Mr. R. H., has been appointed (temporarily) Surveyor to the Bromsgrove Improvement Commissioners and Urban Sanitary Authority, *vice* Such, resigned.

PASCOE, Mr. Joseph, has been re-appointed an Inspector of Nuisances for the Helston Rural Sanitary District until Michaelmas next, at the rate of £30 per annum.

PONTING, Mr. A., has been appointed Treasurer to the St. Anne-on-the-Sea Local Board and Urban Sanitary Authority, *vice* Dalby, resigned.

PORTER, Mr. F., has been appointed Surveyor and Inspector of Nuisances to the St. Anne-on-the-Sea Local Board and Urban Sanitary Authority, at £56 per annum, *vice* Lloyd, appointed Surveyor and Gas Engineer to the Lytham Improvement Commissioners and Urban Sanitary Authority.

PRESSWELL, Mr. Henry Jardine, Solicitor, has been appointed Town Clerk and Clerk to the Urban Sanitary Authority of Totnes, at £70 per annum, *vice* his father, deceased.

RAWLINGS, Mr. George, has been appointed Inspector of Nuisances for the Warminster Urban Sanitary District, at £20 per annum, *vice* Adams, resigned.

REAY, Mr. James, has been re-appointed Inspector of Nuisances for the Brampton Rural Sanitary District, Cumberland, at £40 for one year.

ROBERTS, Mr. David, has been elected a Member of the Rastrick Local Board and Urban Sanitary Authority, Yorkshire, *vice* Kaye, deceased.

ROBERTS, Mr. Robert, has been re-appointed Surveyor and Collector to the Dolgelly Local Board and Urban Sanitary Authority, at £25 for one year.

RYDER, Richard, M.D., L.R.C.P.Edin., L.R.C.S.Irel., of Nailsworth, Gloucestershire, has been appointed Certifying Surgeon under the Factory and Workshop Act.

SHEPPARD, Mr. Charles, has been appointed Clerk to the Battle Local Board and Urban Sanitary Authority, at £30 per annum, *vice* Arnold, resigned.

SIBRAY, Mr. J., has been elected a Member of the Handsworth Local Board and Urban Sanitary Authority, *vice* Mr. F. Sibray, his brother, resigned.

SIMPSON, Mr. George, has been elected a Member of the Chelmsford Local Board and Urban Sanitary Authority, *vice* Turner, deceased.

SKINNER, Mr. Thomas S., has been appointed Clerk to the Falmouth and Truro Port Sanitary Authority, at £30 per annum.

SPEECHLEY, Mr. Loomes, has been appointed Assistant Surveyor and Collector of Highway Rates to the Whittlesea Improvement Commissioners and Urban Sanitary Authority, at £50 per annum.

THOMPSON, Mr. William, has been appointed Clerk and Collector to the St. Anne-on-the-Sea Local Board and Urban Sanitary Authority, at £40 per annum, *vice* Lloyd.

WALTON, Mr. Joseph, has been re-appointed Inspector of Nuisances for the Alston-with-Carrigill Rural Sanitary district, Cumberland, at £20 for one year.

WATTIS, Mr. Wm., for many years relieving officer in the service of the Board of Guardians for the West Bromwich Union, has been appointed Assistant Overseer and Collector of poor rates for the parish of Wednesbury, in the same Union, in the place of Mr. W. L. Tapson, resigned.

WEATHERSTON, Mr. Thomas, has been re-appointed Surveyor and Inspector of Nuisances to the Cockermouth Rural Sanitary Authority, at £120 per annum for three years, and to the Workington Port Sanitary Authority, at £5 for one year.

WHEELWRIGHT, Mr. John G., Manager of the Halifax Commercial Bank, has been appointed Treasurer to the Corporation and Urban Sanitary Authority of Halifax, *vice* Bowman.

WILLIAMS, Mr. Daniel, has been elected a Member of the Mountain Ash Local Board and Urban Sanitary Authority, *vice* Martin, resigned.

WILLIAMS, Mr. Henry, has been appointed Clerk to the Chippenham Guardians and Rural Sanitary Authority, at £100 per annum as Clerk to the Guardians, £20 per annum as Clerk to the Rural Sanitary Authority, £20 per annum as Clerk to the Assessment Committee, £10 per annum as Clerk to the School Attendance Committee, £10 per annum as Returning Officer, and £40 per annum as Clerk to the Highway Authority, *vice* Phillips, resigned.

WILSON, Mr. George Munkhouse, Solicitor, has been appointed Town Clerk and Clerk to the Urban Sanitary Authority of Wilton, Wilts, at £30 per annum, *vice* Mayo, resigned.

WOOLGAR, Mr. J. P., has been elected a Member of the Battle Local Board and Urban Sanitary Authority, *vice* Sheppard, appointed Clerk.

VACANCIES.

MEDICAL OFFICER OF HEALTH for the Parish of Chelsea.

MEDICAL OFFICER OF HEALTH for the No. 1 Division of the Wycombe Rural Sanitary District.

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MEDICAL OFFICER OF HEALTH for the Cromer Urban Sanitary District, Norfolk.
MEDICAL OFFICER OF HEALTH for the Grange Urban Sanitary District, Lancashire.
TREASURER to the Martley Guardians and Rural Sanitary Authority.
TREASURER to the Upton-on-Severn Guardians and Rural Sanitary Authority.
TREASURER to the Corporation and Urban Sanitary Authority of Sandwich, Kent.
TREASURER to the Cromer Local Board and Urban Sanitary Authority.
TOWN CLERK AND CLERK to the Urban Sanitary Authority of Richmond, Yorkshire.
SURVEYOR to the Urban Sanitary Authority of Richmond, Yorkshire, £100 per annum. Application, 17th inst., to F. B. Senior, Clerk to the Authority.
SURVEYOR to the Ilkeston Local Board and Urban Sanitary Authority, Derbyshire.
SURVEYOR, INSPECTOR OF NUISANCES, COLLECTOR to the Cromer Local Board and Urban Sanitary Authority.
SURVEYOR, INSPECTOR OF NUISANCES, and COLLECTOR to the Worsbrough Local Board and Urban Sanitary Authority; £150 per annum. Application, 22nd instant, to Isaac Longley, Esq., Chairman, Worsbrough Bridge, near Barnsley.
ACCOUNTANT to the Wallasey Local Board and Urban Sanitary Authority, £200 per annum. Application, 21st inst., to T. Somerville Jones, Clerk, Egremont, Cheshire.
COLLECTOR to the Ilkeston Local Board and Urban Sanitary Authority.
COLLECTOR to the Clayton Local Board and Urban Sanitary Authority. Application (stating salary required), 16th instant, to B Ashton, Clerk.
INSPECTOR OF NUISANCES for the Walker Urban Sanitary District; £70 per annum, for three years. Application, 27th instant, to T. M. Sturgess, Clerk to the Board, 34 Collingwood Street, Newcastle-on-Tyne.
INSPECTOR OF NUISANCES for the Scarborough Urban Sanitary District.
ASSISTANT SANITARY INSPECTOR for the Wandsworth District. Application, May 19, to J. C. Radford, Surveyor, 113 High Street, Putney.

LOCAL INTELLIGENCE.

The Blything Guardians and Rural Sanitary Authority, at their first meeting after the annual election, re-elected the Earl of Stradbroke chairman for the fiftieth time. It had been felt that so remarkable an event should not be passed over without some official recognition, and accordingly a committee was formed, subscriptions were obtained from about seventy past and present guardians and officers, and a very handsome and massive silver salver was procured and presented to his lordship by Mr. Lomax, the first vice-chairman. The salver bears the following inscription:—'Presented 21st day of April, 1884, by the Guardians and Officers of the Blything Union, to the Right Hon. John Edward Cornwallis Earl of Stradbroke, upon his Fiftieth election as Chairman of the Board, in testimony of their esteem of his valuable services and devoted attention to the interests of the Union.' Lady Stradbroke then presented to the Authority, through Mr. Lomax, a copy of the well-known engraving of Lord Stradbroke, taken about twenty years ago, representing his lordship standing with his hat off against a column, and attended by one of the famous Henham greyhounds.

The Thornhill Local Board and Urban Sanitary Authority signalised their first meeting, after the annual election, by an all-night sitting. All the members were present, and two of them were nominated for the office of chairman; the votes were equal, and, under the impression that an appointment *must* be made at the first meeting and could not be adjourned, they sat for twenty-one hours, but at length adjourned without any result.

The Rugeley Local Board and Urban Sanitary Authority have increased the salary of Mr. Robert Landor, the clerk, from £30 to £50 per annum.

The Milverton Local Board and Urban Sanitary Authority, at their last meeting, passed the following resolution unanimously:—'That Mr. Handley, the late clerk, having resigned his office on account of impaired health, this Board records its sense of the faithful manner in which he has discharged his duties for the period of nine years, and the regret with which Mr. Handley's resignation has been accepted by the Board.'

The Tredegar Local Board and Urban Sanitary Authority have increased the salary of the clerk by £80 per annum.

At the last meeting of the Stafford Guardians and Rural Sanitary Authority, a letter from the Local Government Board was read, declining to sanction the proposed reduction of the salary of the Medical Officer of Health from £75 to £50 per annum, 'as such alterations are calculated to induce a diminution of zeal on the part of the officers affected,' and requesting the Authority to reconsider the matter, which they decided upon doing at the next fortnightly meeting.

The Longton Town Council and Urban Sanitary Authority have, upon the recommendation of the Parliamentary Committee, voted one hundred guineas to Mr. Hawley, the Town Clerk, for the very valuable services rendered by him in promoting and carrying the Improvement and Extension Acts of 1883 and 1884.

Mr. Richard Welford has been re-elected Chairman of the Gosforth Local Board for the seventh time.

APPRECIATION OF SERVICES.—The Town Council and Urban Sanitary Authority of Chepping Wycombe, commonly known as High Wycombe, upon the suggestion of the Mayor, at a special meeting, to take the necessary steps for filling the offices of Sur Inspector of Nuisances, and Collector, which had become vac the death of Mr. William Upton Orman, agreed to subscribe themselves for a memorial over his grave, as an expression of at his loss.

Cromer, Norfolk, has been constituted a local government with a board of nine members, viz., Messrs. G. Breese, B. Cabbell, B. Rust, G. Riches, senr., S. Hoare, W. G. San A. E. Fluder, Ernest Jarvis, and Dr. Robert McKelvie. Ther twenty-one candidates.

THE PLEASURES OF HOUSE BUILDIN

THE following humorous lines are taken from one series of poetical sketches entitled 'Nathan Ba Sketches in the Retired Life of a Lancashire But published in the *Manchester Weekly Times*:—

If e'er aw spend a hawp'ny moore o' brass
I' brick an' mortar stuff afore it's built,
Aw'll suffer like a fatted cawf t' be kilt.
'An honest mon's the noblest work o' God'—
So th' poet says—but dostno think it's odd
He's med so few o' th' sort, an' thoose he's med
By th' most o' folk are reckon'd soft i' th' yead?
Aw've seed sich wark, aw'm fain to think it's true,
As th' actor said, 'at 'honesty's a foo'.'

* * * * *

They say there's good an' bad i' every line;
There happen is: I know there is i' mine.
If God's med any honest builders, though,
There seems a deal o' mystery wheer they go.
It seems to me they'n getten lost or strayed,
For aw've ne'er come across one yet i' th' trade.
They'n happen bin bowt up like th' china ware
'At's scrambled for becos it's owd an' rare.
Aw think it mun be so, for if aw see 'em,
It's likely t' be as mummies i' th' museum.
Sin' aw jack'd th' contract up, an' paid mysel',
They'n bin like devils letten loose fro' hell.
There's howdfasts, nails, an' screws, if aw've bowt one,
Aw'll lay my life aw've welly bowt a ton;
That plasterer's had as mony bags o' hair
As met ha' plastered six i'stead o' th' pair.
It isno pounds they'n done me on, bu' scores;
That joiner bit me gradely wi' them doors;
They're hung on hinges med to take three screws,
An' th' dirty wastrel's nobbut put in twos.
An' as for mowldin'—nay, theau needno smile—
If he's had inches, he's had mony a mile.
Some stales your timber, some your lead, or lime;
But th' plumber licks 'em a' at fudgin' time.
He'll put his pot on th' fire to melt his lead,
An' let it stop till th' handle's welly red;
An' then he'll snatch it off—too hot to howd—
An' let it stand to cool it—till it's cowd;
An' then he'll put it on again, an' when
He's look'd o'er th' papper, taks it off again;
An' then he'll potter wi' it on to th' roof,
Bu' what he does theer nob'dy has no proof,
An' th' gaffer doesno care how lung he stays,
As lung's he charges th' time an' someb'dy pays.

* * * * *

What aw've bin done on i' my gizzard sticks,
An' th' weight of a' my trespass upo' th' law
Feels asier nor my losses i' my craw
Now th' on'y grain o' comfort aw con land
Is t' think at th' start aw'd had a bit i' hand.

NOTES AND QUERIES.

Having for some time back been in the receipt of Queries a taining strictly to sanitary work, and which it would be easy to ans without having to refer our correspondent to competent professi advisers, we have opened a column in which to register such Queries Replies thereto as can fairly be expected from us; and our subscri and readers are invited to make such use of this column as will t to benefit themselves and the community. Both Queries and Re will, however, be subjected, if unnecessarily long, to a strict curtailm

122. MANDAMUS TO COMPEL WORKS OF SEWERAGE.

In Vol. iii. of the SANITARY RECORD, p. 422, it is stated that a had been granted for a mandamus to compel the town coun Lincoln to provide sewerage works for the city, and I b inquire, with what result? J. M.

[The result of the proceedings against the town council Lincoln was that the town council adopted a system of sewe (Mansergh) now completed, and the house connections are also nearly all done. Great opposition was at first experienced, now the advantage is universally acknowledged by the inhabitants.—ED.]

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ORIGINAL PAPERS.

SOME FACTS CONNECTED WITH THE LONDON BURIAL-GROUNDS.

By Isabella M. Gladstone.

Mr. Holland's bill for the prevention of building on disused burial-grounds has passed its second reading, but, though the measure is much needed, some time may elapse before it becomes law. At present there are many serious difficulties connected with the question of building upon ground, especially if it be unconsecrated, which has been used for the interment of human bodies; it is high time that the knotty points were dealt with and finally settled. In considering this bill, three questions will naturally arise in the public mind: Where are these burial-grounds? What has been done with them hitherto? What is to be done with them in the future?

They are everywhere, though we may not be conscious of it. Ever since the practice of burial arose in this country tracts of land have been appropriated for the purpose among the green fields, the woods, the moors and the fens, in the centres of the cities, in their outskirts and suburbs. The grass waves gently over their sites, the sea has encroached upon them, the ever-increasing towns have swallowed them up, we have lost all knowledge of where they were, earth has returned to earth, and the resting-places of our ancestors are used as the foundations of their descendants' dwelling-places. Now and again an antique sepulchral monument, urn, or coffin may be discovered far beneath the soil, and may give the clue to the site of another of these ancient burial-grounds, but most of them are wrapt in oblivion, and we pass them by unnoticed, unknown.

The Romans buried their dead outside the city walls, at some distance from the haunts of the living. From the position of the various sepulchral remains that have been found, it is probable that a vast cemetery existed in Roman times from Bishopsgate to what is now High Street, Shadwell. The oldest remains, and these are really of British origin, have been discovered nearest to Bishopsgate. Traces of ancient sepulture have also been met with as far south as the New Kent Road, Snow Fields, and Union Street, Borough, and as far west as Ludgate Hill and Newgate Street. At the time of the Roman occupation of Britain men belonging to different legions were stationed in the outlying parts of London, and most of the monumental stones that have been dug up were originally erected to the memory of these foreign soldiers.

The earliest Christian cemeteries were attached to the conventual establishments. Of these none remain intact, though parts of them may be preserved in the graveyards of Westminster Abbey, St. Mary Magdalen, Bermondsey, St. Helen, Bishopsgate, St. Katherine Cree, Leadenhall Street, and several other churches. It was with the introduction of Christianity that the idea of the blessedness of being buried in close proximity to the sacred edifices so quickly spread. The parish churches were built, and adjoining them were their churchyards, generally the gifts of private persons. The nearer the church the holier was the grave considered; hence the desire to be interred in vaults beneath a religious conventicle rather than in the ground outside it; hence the privilege of resting under the altar or east end, the most sacred part of all; and hence also the dislike manifested by many at having their departed relatives laid in the grounds which, as the churchyards became too full, had to be made at some distance from the churches. It is needless to say that this has been one of the most fruitful causes of the overcrowded state of the parish churchyards. They were small, as was readily felt at the time of any pestilence, and again private benevolence came to the fore and additional land was granted for the purposes of interment. During the plague of 1349 Ralph Stratford, Bishop of London, purchased three acres to the north of the city walls. This ground has not descended to us, for twenty years after its establishment the pest-field was bought by Michael de Northburgh who erected upon it a convent of Carthusians. Thus the Charterhouse, with its peaceful grey walls, and the retired Square surrounded by old-fashioned houses, which bears its name, occupy the site of an ancient plague burial-ground in which 50,000 bodies are said to have been deposited. The churchyard of St. Paul's Cathedral is probably the oldest now in existence, but it has been greatly curtailed. It was a burying-place in Roman times, and was first walled round in 1285. Paul's Cross stood in one corner, in another part was the ancient Charnel House, whose vaults became so crowded that they had to be periodically cleared out—as, for instance, when the accumulated bones were removed to be used for the mounts of three windmills in Finsbury Fields.

When the Dissenters first arose they used to worship in different city halls and bury their dead in the churchyards, but as they became more powerful they built their chapels and had their own graveyards. There were several in Southwark, and some in other parts of London; but few remain, most have been built upon or otherwise appropriated.

The two eventful years in London's history, 1665 and 1666, brought great changes to its burial-grounds. The plague which thinned the people filled the churchyards, and the buildings in Craven Hill, Bayswater, Poland Street, Soho and Liverpool Street, E.C., are amongst those that occupy the sites of the additional burying places which had to be made. The corpses were crowded into them and they became extremely unwholesome, yet the fact that so many of the bodies were buried without coffins must have conduced to their speedier decay. Bunhill Fields was first opened at this time, but not being required was afterwards used as the chief burial-ground of the Dissenters. The great fire swept away one city church after another and several of them were not rebuilt, but their sites were in many cases maintained and used as additional churchyards for the parishes in which they were situated, and thus the fire as well as the plague provided additional space for the interment of the dead. In very early days the Jews of England were only allowed to bury the dead in one place, the Jews Garden, the site of which is occupied by Jewin Street and its neighbourhood, but after Henry II.'s reign the difficulty was removed and they were able to appropriate land in other parts of the town. Their grounds are well kept and have not been overcrowded; at the present time there are several in London, particularly in the East-end. The Society of Friends, the Moravians, the Roman Catholics and the Sabbatarians had their own burial-grounds, most of which remain, and there were special ones attached to many of the hospitals and workhouses; some of these exist, some

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have been built upon, some are used as yards, &c., one is now for sale as a building site.

Still the population increased, the accommodation for the dead was more and more meagre, and additional churchyards were constantly made. Private adventurers — often themselves undertakers — started private grounds and, as the burial fees were slightly lower than those charged by the parish, these places were much resorted to and became disgracefully crowded. There were always, however, a large number of people who preferred graves in the churchyards, and the sextons were only too ready to find room even if coffins and bodies that had been deposited but a few weeks had to be cut through. Neither the clergy nor the sextons wished to lose their fees, and the sins of the gravediggers were accordingly winked at. The coffin-wood lighted their fires or helped to line new graves, and so fearful has been the treatment of the dead and the consequent danger to the living, not only in London but also in other English towns, that we can but shudder in reading of it. It may be said that these things can go on no longer, and that there is no need to revive the black records of the past. But at the present time a parish churchyard, only a few miles from London proper, is so crowded and yet so much resorted to that, whenever new graves are dug in it, revolting scenes take place. The people like the idea of resting near the old church, and the gravediggers 'find room.' This example is by no means unique.

In March 1842 a Parliamentary Committee was appointed to inquire into the state of the metropolitan graveyards. That additional space was needed had already become apparent. Kensal Green Cemetery, through the unceasing labours of Mr. G. F. Carden, had been started for ten years, and was fast becoming planted with tombs. But the extent of the evil was little known to the public until, in 1839, George Alfred Walker, surgeon, brought out a book entitled 'Gatherings from Graveyards,' the first of a series of publications whose purpose was to expose the evils connected with burials in towns. He boldly struggled for years against the apathy of his fellow-citizens; he was blamed and abused publicly and privately; those whose means of subsistence were derived from the evils he revealed were not slow to accuse him of exaggeration and falsehood. He was a true reformer, and, being in the forefront of the battle, was marked by the enemy. But thoughtful men appreciated the work that Mr. Walker had taken upon himself. Medical men, members of Parliament and others woke up to the enormities which were being daily perpetrated in their midst, and at last the committee was appointed. The evidence of the clergy, medical men, sextons and citizens who appeared before the committee was of the most decided kind. They all witnessed to the overcrowded and disgusting state of the graveyards, to the evil effects of approaching the earth or living near it, and to the disgraceful treatment and exposure of bodies. Mr. Walker's own evidence was a veritable tale of woe.

It was not, however, until 1851 that Mr. Mackinnon's Bill for the closing of the metropolitan graveyards was laid before the House, and in the meantime burials continued to take place. Several leading men banded themselves together to form the Society for the Abolition of Burials in Towns; Mr. Walker delivered a series of able lectures upon the subject; and by means of these and other publications the agitation was sustained. It was shown how it was the practice in Spa Fields, Clerkenwell, to burn the bodies behind a brick enclosure, and how the gravestones were moved about so as to give an appearance of emptiness in certain parts of the ground. It was computed that, by the use of quicklime, by burning the coffins, and by cutting up and trampling upon the bodies an average of no less than eighty corpses were crowded into a space fit for one. This was but one of many awful places, such as the burial-ground just below the windows of King's College Hospital, Enon Chapel, Butler's Ground in Horselydown, or that of Messrs. Hoole and Martin in the New Kent Road. In the vaults of the chapel situated in the latter place 'lodgings' were taken for the dead; the bodies were deposited for six months for £1, after that time the relatives were not expected to inquire the whereabouts of the coffin. This burial-ground is now a timber-yard, and the chapel is used as a saw-mill. These are but a few details; they could be multiplied to any extent. The scandals increased daily, until they were put a stop to by the passing of Mr. Mackinnon's Bill.

The provisions of the Act were that, after a given date, no more burials should take place in churches or within urban districts of a certain size. It also provided for the making of cemeteries, the regulating of burials, the appointment of officials, &c. 'Lastly, we may notice a very agreeable portion of the Act, which promises in time to make the old burial-grounds as great an ornament, and of as great value to the metropolis, as they are at present the reverse. The churchwardens of the different parishes are empowered, after a certain time, to plant them with shrubs and trees, or to turn them to such other purpose as they may determine, provided the ground be not disturbed above a foot in depth for twenty years. Let us hope the builders are not then to come in. . . . We want more open spaces; let us not lose the few we have.'* Since it was passed the Act has been several times amended. Although here and there a family vault may be still used, we have practically ceased to bury in the intramural graveyards, and they have now been closed and disused for thirty-two years. Vast cemeteries were formed further and further away from the mother-parishes, yet the houses of London are growing round them, and they, too, will in time be intramural burial-grounds. Land is being secured for the purposes of interment on the slopes of Middlesex Essex, Kent, and Surrey, and, if the present order of things is to be maintained, what must we prophesy for the dim future? England divided as a chess-board into alternate tracts, the abodes of the living and the resting-places of the dead! From such an issue we can but hope to be preserved.

But it is the disused burial-grounds and what is to be done with them that concerns us now. Mr. Chadwick, in 1850, estimated that they covered a space of 218 acres, of which 176 were parochial, there being by that time an additional 260 acres of cemeteries. Since his report was published some of these acres have been built upon, others have given way to railway lines, have been appropriated as yards for stacking building materials and rubbish of all kinds, or are now used as private gardens. Perhaps we may roughly estimate the existing number of acres at 200, representing about 260 burial grounds. These, with

* Knight's 'London,' Vol. IV., p. 275. (1852.)

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about twenty-five cemeteries, are what now remain of well-nigh 400 burial-grounds which have existed, at some time or other, within the limits of the metropolis. When Charles Knight published the remarks upon Mr. Mackinnon's Bill, which I have quoted above, a difficulty existed that has now passed away—the grounds were extremely unwholesome. But thirty-two years have not failed to do their work; the human remains have been mixing with the soil, and the ground, if undisturbed, is no longer to be dreaded. Of course it may be said that the bodies have been decently coffined and thus preserved. A few, very few, have been interred in lead coffins, these are mostly in the vaults; and a well-made lead coffin, which originally insured the outside world from any injury arising from the corpse, will do so now, whereas, if it did not, every year will help to counteract the effect. But the action of the quicklime, of which an untold quantity was used by the undertakers, must not be forgotten; the soil was permeated with it; the wooden coffins, and even the bodies, were daubed with it, so that it was computed by some gravediggers that they were destroyed in a twelvemonth; the coffins were smashed, and decay was in every way purposely hurried. I therefore have little hesitation in saying that those grounds which were the most crowded with human remains are now the least likely to be insalubrious. They should not be built upon; to disturb the soil may have serious results, and human remains, in whatever state of decay they may be, are not fit for foundations, nor is it seemly or proper to gather them up and burn them in a hole, or to cram them at random and padlock them into chests, to be put into other grounds or convenient vaults. The proper purpose to which the disused burial-grounds should now be put is to make them into gardens. We want more quiet resting-places in London, and here is the chance for securing them. It is hardly necessary in these pages to enlarge upon the importance of preserving the graveyards as open spaces for the inhabitants of the crowded metropolis; and the objection, so often raised, as to their unwholesomeness I have endeavoured to disprove.

But there is the sentimental objection; and though it must ever be tenderly dealt with, yet it is often mere ignorance on the part of those who harbour it. They dislike the idea of games being played over the graves of departed relatives; they do not know that by sect. 4 of the Metropolitan Open Spaces Act (1881) provision is made that the burial-grounds, which may be converted into open gardens and provided with seats, be *not* used for the playing of games. Then they do not like the monuments being taken away, and I acknowledge that in some cases too wholesale a removal of tombstones has taken place; but it must be borne in mind that any descendant of any one interred in these grounds had a right to object, and was probably given an opportunity of objecting, to the removal of their relatives' head-stone. It is customary in 'converting' a graveyard carefully to preserve the tombstones, either around the walls or in a separate building; and to keep a written record of the inscriptions upon them, and of the exact position they occupied before they were displaced. It is among those grounds that are not yet converted that the wholesale destruction of tombstones has taken place. Where are those that once filled the Spa Fields, and the little churchyard belonging to St. Bride's? Perhaps they pave dirty yards, while the 3rd Middlesex Artillery and a corps of volunteers are drilled upon their sites. The churchyards of St. Paul, Covent Garden, St. Ann, Soho, and numbers of others (including many in the City), were once full of upright gravestones; now there are none, or perhaps two or three. The congregation worshipping at St. James's, Marylebone, on a certain Sunday in 1878, were not a little surprised to hear that if they took the trouble to visit their parish churchyard they would find it dirty, untidy, neglected, strewn with broken crockery, newspapers, rotting meat, eggs, bread, orange-peel, dead cats and rats, and every sort of refuse cast from the neighbouring houses; and when their incumbent said that he had counted on one grave, in the centre of the ground, 'twelve old kettles, two coal-scuttles, three old hats, and an old umbrella,' they refused to believe it; but it was true nevertheless. The said ground is better kept now, and will, I trust, ere long, be opened as a garden. But there are many more in this pitiable and disgusting state, while the poor inhabitants of the crowded streets sit on the stone copings outside them and the children climb the broken palings, to gaze upon—the cats.

There is another objection. A churchyard is often a sort of private garden for the rectory or vicarage; the house looks out and opens out upon it, and, if the populace is allowed to enter, it may be that the peace of the inhabitants is at stake. But many have sacrificed a little of their peace and have not been so much disturbed as they expected, while they have been doubly rewarded by the sight of the pleasure thus afforded to their poor parishioners; and others are willing to give up their privilege if funds are forthcoming for the scheme. It was in 1875 that the Rev. Harry Jones, then rector of St. George's-in-the-East, first commenced the hard piece of work, which he eventually accomplished, that of converting the burial-ground at the east end of the church, together with one attached to it, belonging to a Wesleyan chapel, into a most charming flower-garden. Others have followed his example—the Metropolitan Board of Works, the City Corporation, a few of the vestries, the National Health Society, the Kyrle Society, the City Church and Churchyard Protection Society, the London clergy, Lord Brabazon, and last, but not least, the association of which he is president—the Metropolitan Public Garden, Boulevard, and Playground Association—have helped in the work. All the vestries, of course, do not take to the idea: they are too conservative, too money-loving; often they refuse to give one penny towards such schemes, and the conversion of a neglected graveyard into a refreshing garden would fall to the ground, were it not that a voluntary society, such as the Public Garden Association, stepped in to support the vicar's hands and the people's cause. There are now, in full working order, and much appreciated by those who frequent them, twenty-three such gardens, and several are in course of construction; to two other grounds the admission is by ticket; a few are used as playgrounds; several, though not open, are tastefully decorated with flowers; one was opened, but has been since closed.

And now the history of the London graveyards has taken a fresh start; I had almost said two, but I must be careful here. If Mr. Holland's Bill becomes law it will entirely prevent the use of any burial-ground for building purposes, except for the enlarging of a church or chapel therein situated. There are some in the market now; their ruthless

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appropriation as building-sites ought to be stopped at once: we want them as open spaces more and more, and must save them from the builders' grasp. The other question which certainly closely affects the burial-grounds, though apparently making little practical progress, is beginning to be discussed in the public press, and is even coupled with the time-honoured name of the Ancient Corporation. Men are waking up to the idea that the graveyards should be decently kept; that, if decently kept, they must increase at a frightful rate, and another manner of disposing of bodies, one which has been looked upon with such unbounded horror, is now being talked of in 'high places.' It may be that, ere long, the burial-grounds will belong to the days that are gone; if so, there is all the more reason to preserve them from the builders' hands, and to devote them to the public as open spaces. We have lost so many, and these in the crowded parts of the town. We cannot get them back again, but we can refuse to let the existing ones depart, and, learning a lesson from the past, resolutely determine to do better in the future.

Since this paper was written a letter has appeared in the *Times* strongly condemning the conversion of burial-grounds into gardens for sanitary reasons. Mr. Ellis Lever quotes the opinion of an American chaplain of the Navy, whose description of Washington Square, once the graveyard known as the Potter's Field, in New York, is so extraordinary that we can hardly accept it as true. Either the position of the square is peculiarly low, and the soil exceptionally ill-drained, or else the air of the American city must be very different from that of London. Certainly, if we believe the statement of a local physician, the children of New York must be difficult to rear. Here they thrive and multiply in the closest proximity to the burial-grounds, they are born and bred on the ground floors, and there are thousands whose homes are actually built upon the soil, which, within a few feet of its surface, is saturated with the dead.

PENNY DINNERS FOR SCHOOL CHILDREN. — Mr. Benjamin Clarke has contributed an article to the *Pall Mall Gazette* on the subject of 'Penny Dinners for School Children.' The experiment has been tried in London of distributing penny dinners to children attending elementary schools, and it has proved in the highest degree successful and satisfactory. The children largely availed themselves of the opportunity thus afforded them of obtaining a cheap and at the same time a good substantial dinner, which was distributed three times a week, with a daily average of 185. A total of 1,663 dinners realised, at a penny each, 6*l.* 18*s.* 7*d.*, while the cost was 7*l.* 6*s.* 10*d.*, showing a loss of only 8*s.* 3*d.*, a loss which Mr. Clarke believes may be turned into a profit with more experience, but which he says need not deter anyone from making the experiment. The experiment is likely to be largely tried both in London and the provinces.

ASSAULT ON AN INSPECTOR OF NUISANCES.—At the North Shields Police Court, John Turner, a farmer, was charged with having violently assaulted John Hollins, Inspector of Nuisances, Wallsend. According to the evidence it appeared that the inspector was in a train at the Tynemouth Railway Station, when the defendant and two of his friends, against one of whom the complainant, in the pursuance of his duty, had taken some proceedings, entered the same carriage. As soon as the defendant got into the carriage he seized the complainant by the whiskers violently, and pulled a portion of them out. After hearing the evidence, the magistrates fined the defendant 3*l.* and costs.

THE REPORT OF THE LEEDS SCHOOL BOARD ON OVER-STRAIN CRITICALLY EXAMINED.*

By T. PRIDGIN TEALE, Esq.,

President of the Health Section of the Social Science Association.

MY first impulse on reading the 'Report of the Education and School Management Committee on the question of Charges of Over-pressure or Over-strain in Public Elementary Schools' was to leave it unnoticed. Further consideration, however, has led me to the conclusion that my silence was sure to be misinterpreted as an acceptance of the verdict of the board, and might allow the conclusions arrived at to pass current as a judicial and correct deduction from facts exhaustively collected and carefully and impartially weighed by persons free from bias.

Were the question one between the Leeds School Board and myself such silence might have been justifiable, even wise. But the publicity of the report, and the fact that it goes forth and is gaining currency throughout the kingdom as a scientific refutation of a charge of over-strain in elementary schools renders it of more than local interest, and makes it all the more necessary that its value should be assayed, and that if it turn out on examination to be base metal, it should be marked with its true character. Moreover, my position is not and never has been one of antagonism to the Leeds School Board, to which body no reference whatever occurs in the address which I delivered as President of the Health Section of the Social Science Congress at Huddersfield. My only reference to the Leeds Board was in a speech during a discussion in the combined Educational and Health Departments, in which the action of certain members of the Board was quoted as an illustration of the way in which the money question comes in at every turn to aggravate the pressure of modern educational systems, and to defeat the good intentions of the Education Department.

The resolution of the Board instructing the committee says, 'that in view of public statemens made . . . at Huddersfield . . . having reference to proceedings of this Board, the questions therein raised . . . . be referred,' &c. (p. 3). The report is divided into two portions. In the first, which occupies *forty-nine* pages, 'attention has been confined to the broad charges affecting the present Code and work generally in the public elementary schools of Leeds' (p. 4), a duty which, if I understand the resolution correctly, the committee was hardly asked to undertake. The second portion deals with the 'specific charges against the Leeds School Board in particular' (p. 4), inquiry into which was the main, if not the sole, object of the reference to the committee. These specific charges are dealt with in *one* page, and the consideration of them begins with the following words:—'The special charges against the Leeds School Board are of very minor importance' (p. 52). Verily, 'parturiunt montes, nascetur ridiculus mus.' Seven special charges, culled not quite accurately from Dr. Allbutt's paper, and more or less inaccurately from my speech, are confusedly grouped together in three paragraphs, and are thus disposed of: 'The committee wish to point out that, in every particular, these statements are distinctly opposed to facts' (p. 53). The committee

* Letter addressed to the Chairman of the Leeds School Board.

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deny them *en masse*, being unable, I presume, to refute them individually. Let me take as an example one of the charges which was made by Dr. Allbutt and myself—'That teachers get a bonus mainly on pass percentages (only).' The word 'only' is an interpolation of the committee, and not used either by Dr. Allbutt or myself. This is one of the 'statements distinctly opposed to the facts' (p. 53). Now for the facts. Fortunately, or unfortunately, for the committee, they are in print, and in the Board's official year-book for 1884, page 73:—(*c*) The following augmentations of fixed salary shall also be allowed to head teachers: In schools where the percentage of passes under Art. 109 (*e*) reaches, in boys' schools, 85 per cent.; in girls' and mixed schools, 80 per cent.; and in other schools, so far as specially recommended by the Education Committee as exceptional cases, there shall be payable to the head teacher 20 per cent. of the sums obtained as grant from Government under the following heads.'

Let me take another point. The committee say:—'What may be regarded as practically exhaustive information as to actual facts and results in Leeds for the past five years is now before the board' (p. 8). This means that of 258 teachers, 48 sent no reply; of 285 school managers and others, 128 sent no reply; of 132 medical men, 73 sent no reply—in all 259 who give no information. Of those who reply, 97 send in 'general statements and opinions,' which, by the confession of the committee, are not taken into account in the 'conclusions.' This leaves 319, or less than half, to supply the 'practically exhaustive information before the Board.' How, then, do the committee deal with their information? Having laid down the principle that 'mere statements or views and opinions have not been asked for,' and that 'the conclusions of the report are necessarily based on such facts alone,' *i.e.* 'cases which could be submitted to investigation' (p. 8), they forthwith publish some half-dozen of these unasked for 'opinions,' which happen to be in their favour, setting aside the remainder of the 97 received from medical men, school managers, and teachers, as of no account. Three of these selected opinions are from medical men. The first says:—'I am fully persuaded that no true case exists, if the Code be fairly carried out.' The second says:—'That no case . . . has come before my notice.' The third 'is strongly of opinion that there is little ground for all the noise,' &c. These are the 'trump cards' of the committee—'statements and opinions of great importance and value' (p. 8). What of the remaining unpublished medical opinions, twenty-four in number? The conclusion is inevitable that they are entirely contradictory to the views of the committee, and therefore have been suppressed.

Again, the report says that, although excluded from consideration in the formation of the conclusions, 'these general statements have been most carefully weighed and considered.' By whom? Presumably by the two or three persons who drafted the report. They were not considered by the committee—probably were not even read by the members of committee (*vide* Mr. Wigram's speech in the *Yorkshire Post*, April 11, 1884), and certainly the report gives no evidence whatever of the weighing and considering of them.

Let us next turn to the cases which 'could be subjected to investigation' (p. 8). By whom were they investigated? Not by a skilled, unbiassed subcommittee, but apparently (pp. 20-35) by officers of the Board, who are to the teachers and scholars but policemen in plain clothes. I fail to find evidence in the report to show that any single case was investigated by any single member of the committee.

Now as to the evidence. The committee ask for 'facts,' and repudiate 'reliance on vague opinion,' having a confused notion about the relative bearing of 'fact' and 'opinion' on the question at issue. It is a fact that A. or B. died, or was ill, being at the time, or having been recently at school. But whether school-work had anything to do with the illness or death is, and must always remain, a matter of opinion. Illness and death, as a rule, are made up of many factors, each more or less contributing to the final issue—constitution, surroundings, food, anxiety, chill, overwork, &c. To unravel this complex problem, and to arrive at a correct result—*i.e.* 'opinion'—needs the best skill and experience that can be brought to bear, and, above all, an unbiassed mind, unbiassed by politics, or religion, or the fear of blame. Such a body of persons we have in the medical profession, whose twenty-four general statements and opinions have been discarded by the committee. After discrediting 'opinions,' as of no value in forming their conclusions, what do the committee do? They forthwith publish (case 3, p. 13) the opinion of the schoolmistress, a person whose interest it may be not to expose herself to blame, and so possibly biassed, as a set-off to the opinion of the doctor, whose inducements to be prejudiced are infinitely less than those of a teacher, a parent, or a school manager. In this manner all the way through the committee use 'opinions' as tests of the 'facts upon which alone their conclusions are based' (p. 8).

Now for the 'conclusions,' the most serious part of the report, from the wide circulation they have attained throughout the kingdom. These are tersely, and I believe correctly, summarised in a paragraph which appeared in the *Times* on the morrow of the meeting, April 11, showing, at any rate, the importance attached by somebody to an early publication of conclusions exonerating the Board.

'OVER-PRESSURE IN BOARD SCHOOLS.—Yesterday the Leeds School Board received a report, &c. With respect to Leeds children, during the last five years, out of an average number on the roll of 55,253, altogether forty-five cases of over-pressure had been reported, and the report said that after the most careful investigation of each case "there did not appear to be a single instance of clear and undeniable injury to health or attendance during the whole five years (p. 25)." As to the teachers, the cases were as numerous as those with regard to the children. Considerable evidence was given under this head, and it was stated that the total number of cases reported was forty-five, of which twenty-eight were pupil-teachers, of whom about 1,500 (700?) were employed each year. Of these, however, only one case of injury to health had been proved, though four had injured themselves by voluntary excessive study.' 'In eight cases among head teachers in only two cases was the over-strain chargeable with injuries to health.' It is a hazardous thing to prove too much. Not a single case among an average of 55,253 children during five years! But one pupil-teacher and two head teachers out of an average of 1,500 for five years! *Credat Judæus!*

Let us inquire whether the conclusions are borne out by the cases. Ninety cases of injury to health by over-pressure have been returned, and after

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investigation by the committee but four are accepted as valid. How is this result reached? Clearly about one-half the cases are instances of ordinary illness, and do not seem to have been alleged to be suffering from school-pressure, and ought not to have been returned. Of the remainder some indeed do not stand the test of inquiry, but there is a considerable residue which the committee fail to break down, or only break down after their own fashion by quoting the 'opinion' of teacher, parent, School Board officer, or patient, to override the opinion of the medical man or the coroner's jury.—Cf. No. 3, p. 13; No. 15, p. 17; No. 1, p. 21; No. 2, p. 23; No. 14, p. 35; No. 17, p. 36; No. 22, p. 39; No. 23, p. 39. Some cases among teachers break down on the plea that if they were overworked it was through their own fault. A few cases remain, such as No. 3, p. 20; No. 21, p. 38; No. 36, p. 43, in which on the face of the evidence published by the committee no other conclusion can be drawn but that they were instances in which health was suffering from school work.

One more point and I have done. Within the last twenty-four hours an extract from the *School Board Chronicle* has been brought to my notice, which, speaking of the report, says, 'A committee consisting of twelve out of fifteen members of a School Board constituted almost of specialists on our system of elementary education held exactly the opposite opinion to that of the teachers upon this principle,' *i.e.* payment by results. Now there are four members of the Leeds School Board who may be considered specialists, and these have joined with two other members in a public dissent from the 'Over-strain Report.' Of the majority of seven who carried the adoption of the report by the Board, six had only been members of the Board for a year and a half.

Having undertaken as a public duty this critical review of the report of the Leeds School Board on Over-Pressure, I have deliberately come to the conclusion that it is not judicial, that it is not a correct deduction from the facts collected and presented, that the facts have not been exhaustively collected, that they have not been carefully weighed by the committee, nor impartially weighed without bias. Let those who will take the trouble to study the report judge whether my verdict be true or not.

MESSRS. ROBERT BOYLE & SON, of 64 Holborn Viaduct, have received an extensive order from the Russian Government for their large-size Patent Self-Acting Air Pump Ventilators to be applied for the ventilation of the Imperial Manufactory of State Papers, St. Petersburg. This order is the result of the success of the Air-Pump Ventilators applied to the Imperial Mint and Imperial Bank Note Manufactory, St. Petersburg, they being pronounced by the Government officials to be the only ventilators tried which have fully answered their purpose, and effectually kept out the snow in the winter.

THE *Sanitary Engineer*, of New York, states that a Bill has recently been passed at Connecticut prohibiting the sale of ice cut from water contaminated by sewage, mill refuse, &c. The Bill prohibits the cutting of ice for consumption within a distance of two miles from the mouth of a sewer. In Japan, where sanitary legislation has of late received much attention, no ice is allowed to be offered for sale until it has been examined by a competent authority, either at the time of manufacture or cutting. Some provision of this kind might well be adopted in England, since on more than one occasion the consumption of ice has been attended with very serious results.

THE SANITARY SUPERVISION OF BAKEHOUSES, WITH SPECIAL REFERENCE TO THOSE OF BIRMINGHAM.

By Dr. ALFRED HILL,

Medical Officer of Health to Birmingham.*

IN fixing upon a subject for a short paper to be read before this Society, the usual difficulty of deciding presented itself; the decision in the present instance was determined by the circumstance of the passing of the Factory and Workshops Amending Act of last year, which transferred the duty of the sanitary inspection of bakehouses from the inspectors under the Factory and Workshops Act, 1878, to medical officers of heath.

This change is really not the inauguration of a new system, but a reversion, after five years, to an old one which had previously been in operation for fifteen years; for by the Bakehouse Regulation Act, 1863, the duty of inspection of bakehouses devolved upon the local sanitary authority, and it was not until the repeal of this Act by the Factory and Workshop Act of 1878 that such duty was transferred to the inspectors under the Factory and Workshop Act of that year. Seeing that the duties involved refer principally to sanitary conditions, it must be admitted that the sanitary provisions of the amending Act of 1883 are made in the true interests of public health, for I cannot help thinking that under inspection by medical officers of health, such a state of the bakehouses as has been revealed in the Metropolis would have been impossible. It appears to me that there are two good reasons at least why lay should be less efficient than medical officers. The first is, that a non-medical inspector would not sufficiently direct his attention to sanitary defects, being less acquainted with their character and less interested in them; and the second is that his general duties would, from their extent, not allow him time to make the necessary examinations. But dismissing all speculation, it seems to be a fact that inspection of late has not been either sufficiently thorough or sufficiently frequent. And although cases of sanitary defect might have been referred to the medical officer of health, my experience is that the factory inspector has very seldom availed himself of the clause empowering him to make such reference. Although, therefore, additional work is thrown upon the medical officer by the new arrangement, it is one which I think must meet with the approval of the whole body of medical officers of health.

As the change is one involving new duties and experiences, I imagined it would prove an interesting and fruitful field of action. The somewhat startling revelations that have been made respecting the condition of metropolitan bakehouses led me to expect that a similar state of things would be found to some extent at least in Birmingham; but I am glad to learn that this is not so, and that the condition of our bakehouses is, on the whole, satisfactory as regards the existence of gross sanitary defects and abuses.

The bakehouses embraced by this paper are 198 in number, and were inspected between the passing

* Read at the meeting of the Society of Medical Officers of Health, May 16.

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of the amended Act and April 30, or during a period of four months.

The inspection of the first seventy-seven bakehouses was made by myself, assisted by the inspector of nuisances; but I soon found that it would be utterly impossible for me to find time to perform the work personally, and it became a necessity to depute it to an inspector specially appointed for the purpose, on the principle 'qui facit per alium facit per se.' On representing to the Health Committee the state of the case, an officer was appointed to devote himself exclusively to the inspection of bakehouses and milk-shops; the number of the former in Birmingham I have not yet been able to ascertain, but it amounts to some hundreds, while the milk-shops number over 2,000. The inspector has been specially instructed in the mode of measurement and inspection, and he submits to me his books three times a week, when I examine his notes and records, and confer with him on such points as require discussion or special action.

The points to which I have directed attention are principally position, cubic space, cleanliness, drainage, ventilation, accumulations of refuse, frequency of lime-washing, keeping of animals, the employment of women, young persons, or children, provision for sleeping, existence of water-closets, &c., in or adjoining bakehouses, and water supply.

With regard to position, most of the bakehouses are on the ground level, only very few old ones being underground or consisting of cellars converted and more or less well lighted. The cases in which the light was very deficient were very few indeed. Some of the bakehouses on the ground level consist of back kitchens and wash-houses diverted from their original use, in some cases being small and inconvenient, in others, however, fairly well adapted for their new purpose. The majority of modern bakehouses are detached buildings, capacious, well ventilated, and admirably well suited to the requirements of convenience and health.

The cubic space was found to vary within pretty wide limits, the lowest amount, with one peculiar exception, being found to be 190 cubic feet, the highest 5,300, and the average 827 cubic feet per head. In no instance could there be considered overcrowding. Cleanliness is well observed as a rule, both as regards the condition of the walls and surfaces, and the state of the utensils. Out of the 198 places examined only 21 were found not to have been limewashed with the regularity and frequency required by the Act, and in the best conducted establishments it is common to find that lime-washing is done every three months. From the difficulty of ascertaining the frequency with which the painting of woodwork is done, cleansing of this kind is pretty sure to be neglected, and my impression is that it is done with much less frequency than is either required or is desirable.

The drainage as a rule is well arranged, sinks being disconnected from the drains, and there being very few drain traps situated on the floors. The total number of drainage defects was 12, and these existed more from the want of better knowledge than from any desire to evade sanitary requirements. In every such instance the defect has been remedied on a request and pointing out the danger of its continuance.

Defective ventilation was found in 20 instances, but, as a rule, there was no ground of complaint on this head; it is not that there were no means of ventilation, but that the workmen objecting to draughts intentionally closed the various openings. They become very warm in their work, and, at the same time, more sensitive to cold air, so that it is hardly to be wondered at that they are afraid of draughts.

Accumulations of refuse, principally vegetable, were found in only four instances, but in one of these cases the accumulation consisted of sawdust and fine ashes from the furnace spread upon the floor and allowed to collect to the depth of more than two inches.

The keeping of animals in bakehouses does not prevail to any considerable extent, though the fondness for such domestic pets and the keeping of them in improper places is rather common in the town. Dogs were the only animals discovered in the bakehouses, and these in only three instances. In connection with this point I may state that in only one case did I find a marked odour from the presence of mice.

The employment of children, young persons, and women obtained in fifty of the bakehouses, the numbers of each class being 1 child aged 13, 36 young persons, and 21 women, making a total of 58 of such persons. In all cases of the employment of the classes just named I report to the factory inspector, who is glad to have such information conveyed to him; the information which the factory inspector and the medical officer of health can mutually furnish each other is necessarily calculated to prove very beneficial, and I am pleased to say that in Birmingham, as I trust everywhere else, there is the best of feeling between them.

Water-closets, and other similar forms of convenience, were conspicuous by their absence; in no case did I find one in the bakehouse or in close contiguity to it, but in one case a stable was found in direct communication with the bakehouse, which was pervaded by its characteristic odour, and the same remark as to absence applies to sleeping accommodation. In Birmingham we are well provided with cheap and convenient lodgings in all parts of the town, so that there is really no necessity for such undesirable arrangements.

The conclusions to be drawn from the facts considered are very favourable; many of the points to which attention has been directed are of a negative rather than a positive kind, and it is satisfactory to find that in no case where cause for complaint has been found has it been necessary to do more than make a request for its removal, or, at most, to serve an official notice in order to obtain compliance, no magisterial proceedings having been yet found necessary.

Very little hesitation has been manifested to allow the first inspections to be made, but more frequently such inspections are hailed with satisfaction; they are regarded by intelligent and respectable persons not only as desirable, but as a means of conferring benefit on the master and his employés.

At the rate at which inspections are now being made it will take our inspector about one year to complete the round of the bakehouses; probably such an annual inspection made regularly and efficiently may be enough; this, however, is a point to be settled only by experience, and should more frequent inspections be necessary their number can be readily increased. It is evident, however, that the requirements in this respect will differ in different towns.

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ON THE CALCULATING SLIDE RULE AS AN ASSISTANT TO THE MEDICAL OFFICER OF HEALTH IN MENSURATION AND STATISTICS.*

By GEORGE PADDOCK BATE, M.D.

Medical Officer of Health for St. Matthew's, Bethnal Green.

SLIDE rules are instruments of immense use for purposes of calculation; they are easily learned, and are not liable to get out of order. To one who has once worked with the slide rule and acquired facility in its use, it is always a matter of astonishment that an instrument so rapid and accurate in its results should be so little known, as the drudgery of calculation is saved, and the trouble and liability to error involved in figuring out long sums is avoided by the help of this instrument. Slide rules are of various patterns, but all are constructed upon the same principle, though varying in detail and in manner of usage. The slide rule in its simplest form is a logarithmic scale of double radius. Each half reads from one to ten, and each division is subdivided into tenths and hundredths. A precisely similar scale slides in a groove below it, and the divisions of the sliding scale read against those of the rule itself. The fundamental principles of logarithmical arithmetic are that the multiplication of common numbers is performed by the addition of their logarithms, division by their subtraction, and involution and evolution by the multiplication and division of the logarithm by the index of the power or root required. The slide rule is merely a contrivance for facilitating this, and for avoiding the trouble of hunting out the logarithms of numbers from printed tables, and of turning the resulting logarithms back again into simple numbers. Ordinary addition and subtraction cannot be performed by the slide rule, as it simply multiplies and divides. The ordinary slide rule is a very portable instrument, but its scale is so short and the divisions are so minute, that considerable practice is required before it can be used so as to obtain accurate results. Moreover, it is very trying to the eyesight, for in each operation the *first* figure only is read, and the others have to be found by counting up so many tenths, hundredths, and thousandths.

The rule to which I wish to draw special attention is the one which is the invention of Professor Fuller, of Belfast; in this the scale, instead of being straight, is wound in a spiral form upon a cylinder, and the reading is performed by indices instead of by slide against slide, which is an immense advantage. This spiral slide rule is equivalent to a straight slide rule 83 ft. 4 in. in length. The divisions are thus much more open than in the short rule, and the results are more easily and accurately read. In each operation the first *three* figures will be found engraved upon the rule, the third is counted up by the number of tenths, and the fourth has to be estimated by the eye as a quarter, half, or three-quarters of a tenth; the results are then absolutely correct up to the fourth figure, while the fifth and sixth are only approximately so; but with practice great accuracy may be obtained. All numbers and divisions are to be read decimally, so that, owing to our want of a decimal system, all measurements and quantities must be converted into decimals before they can be worked on the rule. In order to simplify this process as much as possible a series of tables are engraved upon the body of the rule, giving the value in decimals of fractions of the various measurements of length and capacity, and also of money and time, together with some other very useful tables of values.

The rule consists of a cylinder (upon which is engraved the scale); this can be moved up and down upon and turned round a body or axis, which is held by a handle; fixed to the handle is an index, called the 'fixed index,' two other indices (whose distance apart is the axial length of the complete spiral) are fixed to a telescopic tube which slides in and out of the body; these indices can thus be placed in any required position with regard to the cylinder, or to one another.

The rule will work with the greatest ease and certainty multiplications and divisions containing a series of factors, single and double proportion, ratio and interest, and by means of the upper scale, which it would be somewhat confusing to describe without the rule in hand, the powers and roots of numbers are within the capacity of the instrument. It will be seen that the scale commences with 100 and ends with 999. The hundred is read either as one, or ten, or a hundred, or a thousand, as may be required. All the others follow in like manner, so that 999 may be either ·999, or 9·99, or 99·9, or the whole number, thus it is always necessary to know the value of a result for which there are certain simple rules laid down.

Multiplication.—$A \times B$. The cylinder is moved till the first factor is read at the scratch on the fixed index, the moveable index is set to zero, the second factor is then brought to the same index by moving the cylinder, and the product is read at the fixed index, and so on with any number of factors, such as the height, length, and breadth of a room. The rule for the number of figures in the product is the algebraic sum of the number of figures in the factors minus one for each factor brought to the upper moveable index.

Division.—State the divisor and dividend as a fraction, thus—

$$\frac{600}{300} = x$$

Set the fixed index to the numerator and the moveable index to the denominator, then move the cylinder till the upper moveable index is at zero, and the quotient will be found at the fixed index. The rule for the number of figures is the algebraic difference between the number of figures in the divisor and the dividend plus one for each time the upper moveable index is set to the denominator.

Mortality rates and percentages—the ordinary method is to multiply the number of deaths by one thousand or one hundred, and divide by the population.

Table I. of Dr. Orme Dudfield's report on the vital statistics of Kensington for the year 1881 gives the necessary data for calculating the rates shown in Table II.

In order to show the degree of accuracy with which the rule works, I give in each instance the actual result as calculated by ordinary arithmetic to three places of decimals.

* Read at the meeting of Medical Officers of Health, May.

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		Per thousand
1880.	$\frac{2884 \times 1000}{161462}$	= 17·862
	The true result is	17·861
1879.	$\frac{2992 \times 1000}{158316}$	= 18·898
	Should be	18·896
1878.	$\frac{3120 \times 1000}{154305}$	= 20·220
	Should be	20·219
1877.	$\frac{2625 \times 1000}{151310}$	= 17·349
	Should be	17·348
1876.	$\frac{2896 \times 1000}{148338}$	= 19·521
	Should be	19·522

Estimating population is best done by logarithms for rapidly growing districts, and the estimate may be checked in the ordinary way by the birth-rate and by the number of inhabited houses, but by the slide rule it is very easy to estimate the number of persons existing at any particular age upon the assumption that the ratio existing at the census enumeration remains undisturbed. For when either of the moveable indices is at one number, and the fixed index is at the other, and the cylinder is turned into any other position, though the numbers at the indices will be different, *their ratio will remain constant.* Thus, if one index be set to the Bethnal Green population as enumerated in 1874 (120,104 persons), and the other to the number of children under five years of age (18,142), and the cylinder be now moved round so as to bring the estimated population for each year to the upper index, the proportionate number of children may be read off at the fixed index year by year until we arrive at the 1881 population as enumerated (126,961 persons), of whom 19,380 were children. Now, reading the rule we find it gives at the fixed index 19,180, two hundred short of the true number. This is not the fault of the rule but of the method, the results of which can only be an approximation; and when we distribute the error over the ten years it is very small, only twenty per annum.

Mensuration. — The cubic capacity of rooms having a rectangular form is calculated by the multiplication of the height, length, and breadth; and for this purpose it is easier to take all measurements by the decimal measuring rod. I have had constructed, and use measuring rods divided into feet and tenths of feet, instead of inches, but this is not absolutely necessary, as the printed table on the body of the rule gives the decimal value of fractions of a foot.

Circular Wards.—Several hospitals have been built lately with circular wards; the calculation of the cubic contents of such as these would be somewhat tedious, as the method given in books on mensuration is $3\frac{1}{7}$ times the square of the radius multiplied by the height. The decimal value of $3\frac{1}{7}$ is 3·1416, and a ward 52 feet in diameter by 16 feet in height would work out as follows :—

$$26 \times 26 \times 3{\cdot}1416 \times 16 = 33979 \text{ cubic feet.}$$

Calculated out in the ordinary way this gives a decimal fraction over, but unless the original measurements are taken with extreme accuracy it is a superfluous refinement to carry the result to a fraction, so that the figures as given by the rule are quite sufficient.

With a little practice one finds the rule capable of working out many problems, and I should not now like to be without mine. Indeed, I often wonder how I got on before I obtained it, as I am a bad calculator.

It is almost needless to say that all problems must be correctly stated before they can be worked on the rule, for though wonderfully accurate it is only a machine, and of no more use to a person who cannot correctly state a rule of three sum than a pencil is to a child.

The manufacturer of the instrument is Mr. Stanley, of Great Turnstile, and his name is a sufficient guarantee for the accuracy with which it is made.

THE HOUSING OF THE POOR IN BIRMINGHAM AND THE BLACK COUNTRY.

(FROM OUR OWN CORRESPONDENT.)

[*Fifth Article.*]

PERHAPS one of the worst parts of the Black Country, sanitarily speaking, is to be found in the town and neighbourhood of Bilston, lying between the old town of Wednesbury—or Wedgbury, as it is still frequently called—and Wolverhampton. Bilston is one of the oldest towns in Staffordshire, and one of the dirtiest. Five-and-twenty years ago it was one of the most prosperous, but the gradual exhaustion of some of the mines and the flooding of others has caused the trade and commerce of the town to fall off considerably, and misery, wretchedness, squalor, semi-starvation, dirt, and untidiness are prevalent features in some quarters of the town. As is the case with too many other districts in the Black Country, manufacturers, ironmasters, colliery proprietors, and others who have waxed rich on the produce won from the bowels of the earth seem to have left the many toilers through whose industry that wealth was acquired to get on as best they could, and removed to other parts as soon as the enterprises in which they were engaged began to lose their rich remunerativeness. But, on the other hand, the fact cannot be lost sight of that at the time when colliers and ironworkers were earning from 5*l.* to 10*l.* per week of three or four days only, they, as a rule, squandered it all, idling and drinking and gambling — almost throwing money away without thought for a future day when some of it would perhaps save them from starvation. Reckless and improvident as too many of them were, as too many of the same class of toilers still are, when those prosperous times came to an end and adversity set in, they were at once thrown on their beam ends, and some of them have found existence for themselves and families a very difficult matter. There need not have been nearly so much want and wretchedness in the Black Country as there is, had the people but exercised common prudence in the halcyon times that are past. The fact that there is this want and wretchedness, with the recklessness that characterises many of the inhabitants, accounts largely for the squalor and untidiness that so extensively prevails. At the same time the authorities cannot be absolved from all blame in the matter, for, as a rule, even in the more advanced districts, sanitary supervision and the carrying into effect of sanitary measures is not characterised by the

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activity and progressiveness with which such work in these days should be associated. A strict regard for truth also requires that some blame for the existing state of things should be apportioned to the landlords and the landlords' agents, who often show an utter want of care for the requirements of comfort and decency. It is a matter for wonder to persons not well acquainted with the locality that people should continue to live in some wretched, leaky, tumble-down tenements for which they are called upon to pay 2*s.* 6*d.*, 3*s.*, or 3*s.* 6*d.* per week rent. But the answer is very simple. It will be found that most of the tenants of the poorest and worst class of house property have managed to get in arrear with their rent and they cannot clear that up, while, if they attempted to move, the landlord would take the few sticks of furniture they have. And so they have to put up with shelter which in some parts of the country would not be considered good enough for a horse or a pig, and, to save a handful of furniture, lives are sacrificed to disease engendered by damp, cold, and generally insanitary conditions.

The township of Bilston may be divided into two parts, one of which is known as the old town in contradistinction to the newer portion. A few examples of how the poor are housed in this part of the Black Country district, gathered from a recent inspection of the locality, will give some idea of the sort of place it is. There is in the 'old town' a long narrow street called the Greencroft, the houses in which are placed in all manner of corners and at all sorts of angles. One habitation had apparently been at one time the open shop of a butcher. The walls, once coloured blue, were crumbling and broken, and in some places on the ceiling the plaster had fallen, leaving exposed the black and rotten laths. The whole of the furniture in the downstair apartment comprised a kind of sofa made out of an old wooden bedstead, a couple of worn-out chairs, a chest, and a table. The single upstairs room was reached by a step-ladder. Two old women were the occupants, one being close upon seventy years of age and blind. For the accommodation afforded by this shanty, eighteen-pence rent had to be paid. In the same street is a little one-roomed place about 7 feet by 10 feet in area, occupied by an old man and his wife, who prefer passing the brief remainder of their existence together in this box to going to the workhouse. Broken windows stuffed with rags, leaking roofs, cracked walls, and plasterless ceilings prevail, with an utter absence of cleanliness in the case of many of the houses. In some few instances the tenants are found to take upon themselves the task of whitewashing the ceilings or limewashing the walls, and no doubt this would be done throughout the district to a much larger extent than is the case, but that the landlords will not even supply the tenant with the materials to do it with. In passing from Greencroft to other parts of the town largely occupied by the poor, one has to pass along several streets occupied by working-people of a respectable class. The houses hereabout are in tolerably habitable condition, but the streets in which they stand are unsewered in any way, no provision even being made for surface drainage. The result is, not only a foul and almost impassable condition so far as the streets themselves are concerned, and the danger arising from the foul exhalations given off by pools and miniature dykes of stagnant water, but the flooding of the cellars and basements of the houses in rainy seasons, with the inevitable results of damp air, damp walls, and the generation of unwholesome gases which find their way into every room of the house. This kind of thing is a very general defect in the Black Country, where surface drainage invariably prevails, and deep drainage is, in practice, unknown. Such streets are usually within the category of 'private streets,' not having been taken over by the parish authorities. But local authorities have large powers under the Public Health Act in reference to such streets, and all that is required in order to compel the owners to put them into proper repair is to be able to prove their insanitary condition. On this head we are able to say, as the result of considerable experience and a tolerably precise knowledge of most parts of the Black Country district, that in ten out of every dozen such cases where the streets contain inhabited houses, there would be little difficulty experienced in putting the Act in force. Much remissness is shown by the local authorities in exercising their powers in this respect, and, although it may sometimes arise out of consideration for the small freeholders and impecunious landlords, it is not fair to the people who reside there, and is small encouragement to others who live in crowded, pestilential courts, to leave them for more open but equally insalubrious localities and equally damp though more commodious and better-built tenements. The Bilston people are fond of 'folds,' apparently, among the street nomenclature being Winn's Fold, Pebble Fold, Foster's Fold, Workhouse Fold, and Poor Man's Fold. Foster's Fold is reached from the High Street. The houses in it are old and dilapidated. The weight of the old tile roof has caused the outer walls to bulge until they present the appearance of waiting a fitting opportunity to collapse altogether. One has succumbed, the others ought to be made to do so. The living rooms in these places are about 9 feet square, and the black beams which cross the ceilings can easily be reached. The closets belonging thereto are placed at the top of the Fold, and are, structurally, about on a par with the dwellings. Workhouse Fold, so-called because the old workhouse occupies a conspicuous position in the yard, is also reached from the High Street by means of a passage or entry, is a very poor place so far as the circumstances of its occupants go, but is tolerably clean. The poverty, dire as it is, is borne with patience by some of the inhabitants in preference to the workhouse itself, with its separation system for man and wife. One or two of the houses, however, may be described as being the reverse of dry, clean, or comfortable. A house in Poor Man's Fold is a low, dilapidated, shed-like structure, the open door of which gave a glimpse of a filthy interior. The sitting-room, about 6 feet square, contained for furniture an old bench and table. Adjoining this was a room used by the occupants—an old man of sixty, a cripple, and his daughter, aged about thirty—for sleeping purposes. This room was also small, low, and filthily dirty. Other of the houses were no better, and the tenants could get nothing done to the interiors. In one case a coat of paint had been put on the outside woodwork, but inside the plaster was falling from the ceiling, the brick walls were in places quite bare of covering, except dirt, and the woodwork was actually rotting for want of a little paint. The sanitary condition of this property may be gathered from the fact that the occupants of a house adjoining a huckster's shop had been in the habit of throwing all kinds of refuse into a space between the walls of

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two dwellings. This refuse had accumulated to such a degree that the liquid filth percolated through the wall into the back kitchen at the shop to such an extent that the occupant had to make a receptacle—a description of indoor sewer—into which it could run. The tenant said that as many as twelve bucketsful of filth had been taken out of this place at one time, and yet she would not complain to the Inspector of Nuisances, lest it should lead to her being turned out of a place in which she had lived for forty years. It is a singular experience, to be met with in many parts of the Black Country, that of the clinging affection entertained for what it is a misnomer to call a house—dirty, insanitary, damp, draughty, and generally unhealthy though it be—by persons who have lived in it for a number of years. They seem ready to bear all the ills that flesh is heir to, if it be necessary, rather than remove into another habitation. The chief solace and support of one old dame, however, was not the house she occupied in this same Fold, but her old black pipe and baccy, and she professed herself able to go without food for three days at a stretch if she could but get plenty of the 'weed.' An old and most unwholesome sewer existed under this house, and did not require to be seen to make its existence manifest. In Wolverhampton Street a number of the houses are very old, and some of the front walls bulge out to such an extent that the wall has separated from the floors and left the front of the house in so insecure a state, that the tenant has had to put up a strong upright to sustain the walls and support the ceiling. The yards and outbuildings have this in common, that the middens are all open, and the closets and pig-styes are within a few feet of the house doors. Black Horse Yard is another unsavoury locality, with a number of tenements for which the rent charged is 2*s.* 4½*d.*, the odd halfpenny being levied to pay for the water supply. There is but one closet for the whole of the tenants. Quarry Lane is even worse. One of the dwellings, about the size of a tolerable sized pig-stye, and with but one sleeping room, afforded accommodation for five persons—mother, children, and lodger. The place is gradually falling to pieces; some adjoining houses have had to be closed. For four houses (including the two closed) there is no closet accommodation whatever, and the tenants had to pass through a neighbour's house on the opposite side of the way to reach the sanitary offices. In Cold Lane is a row of two-storey cottages. In the first house of the row the wall had given way through the subsidence of the soil beneath, and yawning cracks in the brickwork admitted more ventilation than was needed or always pleasant. There was a closet about four feet from the back door. At another house in the same row the closet was built against the back wall; the liquid filth penetrated into the kitchen, and the stench, as may be supposed, was horrible. In Bridge Street is a block of buildings locally known as the 'Bull Holes,' where the rain came in at the walls and roofs, and the doors and windows were of the most rickety sort. In the absence of a proper receptacle for the ashes and refuse from the houses the inhabitants had dug a large hole about six feet from the door of one of the houses, where liquids and other refuse was thrown until it could be removed further off. Instances of the kind could be largely multiplied, but we have, though very cursorily, sketched sufficient to show that the Bilston Commissioners have their work cut out for them for a long time to come if they desire to successfully grapple with the many foul rookeries and fever dens that pollute the township. Much of the insanitariness is due to the careless and dirty habits of the people themselves. But much of it is curable and preventable by a thorough and energetic exercise of their duties by the sanitary authority and officials, and, as a rule, the people themselves acquire cleanlier habits when the surroundings of their dwellings are kept clean and wholesome, just as they become careless and neglectful when surrounded by filth, impurity, and stench.

The Artisans' Dwellings Committee appointed by the Birmingham Town Council to inquire into the nature and extent of the house accommodation in the borough, adapted for occupation by the artisan classes, have just issued their report, which will be presented to the next meeting of the Council. The report states that in all forty-one persons were examined, the inquiry being as to the sufficiency of the dwelling-house accommodation for the artisan and labouring classes, its sanitary condition, and the amelioration it was in the power of the Town Council to effect. Under the first heading they found that out of 65,969 houses within the borough at 7*s.* per week rent and under, 5,273, or nearly 8 per cent., were void, the largest percentage being in the cheapest description of house let at 2*s.* 6*d.* a week and under. Under the second head the Committee refer to the more insanitary parts of the borough and to the places where 'jerry' building and uninhabitable tenements most prevail. These have been described in previous articles in the SANITARY RECORD, and need not be recapitulated. The overcrowding they do not consider serious, as compared with that in London and other large towns. Its cause in many instances, the report states, is probably the result of the intemperate and improvident habits of the people, but it is also caused by long-continued depression of trade. On the whole, the evidence presented to the committee leads them to the conclusion that the dwelling-house accommodation for the artisan and labouring classes is, generally speaking, 'in a fairly sanitary condition, and that overcrowding does not exist to any great extent.' As to the amelioration, the committee are in favour of the adoption to a limited extent of the system of scavenging and cleansing courts in vogue in Glasgow; they are not in favour of the erection of 'flats,' except upon a small scale and as applied to two-storey tenements, and they are gratified by the testimony given during the inquiry to the benefits resulting from the substitution in so many instances of pan-closets for the very objectionable middens, and also to the increased favour with which the pan system is received. Finally, they recommend (1) that all new houses should be certified by some competent official before the same are allowed to be inhabited; (2) that extreme care should be exercised by the building surveyor in the supervision of the materials used in the construction of houses; (3) that the staircases of new houses should be better constructed; (4) that the Corporation should employ scavengers and whitewashers to cleanse the worst courts occasionally; (5) that it is very desirable all courts should be lighted; (6) that more suitable closet accommodation should be provided for children; (7) that single houses should be thoroughly stripped, papered, and lime-washed at least once in two years, and others once in three years; (8) that cheap trains and tram-cars should be run to and from the suburbs; (9) that it is desirable some

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model dwellings for the working classes should be erected by private enterprise. The conclusions arrived at appear somewhat lame and impotent, considering the nature and extent of the inquiry, while it is certain that the committee have not taken a too severe standard as to sanitary requirements. Most of the recommendations the Council has ample power already to carry into effect, and these, it is suggested, should be referred to the Public Works and Health Committees. The employment of scavengers and whitewashers to cleanse the courts and privies, the regular cleansing of houses, the provision of increased railway and tram-car facilities, and the suggestion as to the erection of model dwellings, are the most meritorious recommendations, and worthy of special attention.

THE REPORT OF THE MEDICAL OFFICER OF THE LOCAL GOVERNMENT BOARD.

DR. BUCHANAN'S report for the year 1882 is as interesting as usual, but is it too much to expect that it should appear before the occurrences to which it refers are all of them nearly eighteen months and some of them more than two years old? It chances that this time there has been a special reason why it should be promptly issued, the uncertainty, namely, as to the circumstances under which Dr. Cory, the Chief of the National Vaccine Establishment, came to be inoculated with syphilitic poison. The story, as now unravelled in the report, is a very simple one, and need not cause any uneasiness to vaccinators or parents. But it finally disposes of an old stock argument of a certain school of thought that vaccine lymph, from whatever source derived, can, providing there be no admixture of blood or pus, propagate vaccine only. The commission of eminent medical men who kept Dr. Cory under observation state indeed explicitly, 'that it is possible for syphilis to be communicated in vaccination from a vaccine vesicle on a syphilitic person, notwithstanding that the operation be performed with the utmost care to avoid the admixture of blood.' It appears that with a view to settle for himself the vexed question whether vaccine lymph taken from a syphilitic person, if unmixed with the blood of the vaccinifer, does not contain the syphilitic virus, and is incapable of imparting syphilis by its inoculation, Dr. Cory made at intervals four separate experiments on himself, the last successful, with lymph derived from obviously syphilitic children.

But the infants from whom Dr. Cory took lymph for his personal vaccination were in all cases but one, which was unsuccessful, not suffering from hereditary disease in a latent form, but were infants in whom active symptoms were unmistakably present, as shown by cutaneous eruption, snuffles, mucous tubercles, and ulcerations. Out of the four children in question, one only was proved to have been capable of imparting syphilis by the lymph taken from its vaccine vesicle. These infants were all in such a condition of obvious syphilitic disease as would certainly have precluded their use as vaccinifers by even an inconsiderate and reckless vaccinator; indeed, they were selected by Dr. Cory for his self-vaccination, because they were unquestionable syphilitic cases.

It has in this country always been laid down as a fundamental rule not to use the lymph of an unhealthy person, whatever the nature of the ill-health, for the vaccination of others. The instructions of the Local Government Board require the vaccinator to 'take lymph only from subjects who are in good health,' and to 'always carefully examine the subject as to any existing skin disease, and especially as to any signs of hereditary syphilis.' Dr. Cory's result does not, therefore, give any new rule for the guidance of the practitioner. The existing obligations on the vaccinator will remain neither weakened nor strengthened; and the result of Dr. Cory's experiment, in which the ordinary rules of practice were necessarily disregarded, does not, in the words of Dr. Buchanan, 'in the least affect the conclusion derived from long-continued experience of properly conducted vaccination, that the observance of the recognised rules is, in practice, a sufficient safeguard against the transmission of syphilis.'

Amongst the other papers dealing with vaccination, tabular statements are given with respect to the state as regards vaccination of the births registered during 1880, the inspection of public vaccination carried out by the medical staff, and the operations of the National Vaccine Establishment. A useful summary is also printed of the laws regulating the practice of vaccination in the several countries of Europe. From this it appears that there has been a general increase of stringency in requiring vaccination in the laws of various countries since the severe epidemic of small-pox in 1870-1. Throughout the German Empire the operation has been obligatory since 1875. On the other hand, a proposal for uniform compulsory law throughout the Swiss cantons was rejected by the popular vote in 1881, the cantons objecting, it would seem, to transfer to the Federal Government what they regarded as being their own legislative functions.

A practical report is made by Mr. Shirley Murphy on the operations of the Animal Vaccine Institution, established in 1881, at Lamb's Conduit Street. The chief practical interest in this report consists in the indications that are beginning to appear that there is much less difference than has hitherto been supposed between calf lymph and humanised lymph. Dr. Buchanan observes on Mr. Murphy's figures, that certainly the care and judgment wanted for proper selection of lymph in the case of one are wanted in the case of the other; as in the child, so in the calf, there are peculiarities of individuals to be apprehended, imperfect and irregular vesicles to be avoided, development of special characters in the lymph during successive cultivations to be watched for. And, under the actual conditions of lymph selection and of operation observed at Lamb's Conduit Street and at Surrey Chapel respectively, there has recently seemed little to choose between the one and the other kind of lymph, either in respect of insertion, success, or in respect of local and constitutional effect produced. Further, the influence of storing upon the activity of the lymph, at one time believed to be more rapid and more pronounced in the case of the calf product, is now appearing to be not very different in the case of humanised lymph and calf lymph.

Inquiries as to local prevalences of disease were made in thirty-one instances. The more important of these we have already noticed at the time of the issue of the detailed reports. Some interesting

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speculations are promulgated by Mr. Power, from his experiences of the St. Pancras outbreak in 1882, as to the manner in which the specific contagiousness of scarlatina obtains access to milk. In this case scarlatina appeared in several London districts at the same moment among many consumers of a particular milk and not among their neighbours. It can be said that the milk was unquestionably the vehicle of the epidemic, yet the history of that milk could be traced with a good deal of certainty from its leaving the cow at a Surrey farm to its delivery in houses of central London, and no method by which it could have received the infection of human scarlatina was to be suggested as in any way probable. Thus a hypothesis that the milk actually possessed at the moment of entering the pail the power which it assuredly had of producing scarlatina in the human subject forced itself upon consideration.

In this position of the question, research into the liability of the cow to suffer from disease of a nature allied to scarlatina, has been begun for the department by Dr. Klein. He has found that a cow, having recently calved, when inoculated experimentally with human scarlatina, is affected by an ailment which is transmissible after the manner of an acute specific disease to dogs; that this ailment in the cow is not accompanied by any marked fever, does not take her off her food, and does not alter the quantity or visible characters of her milk. Its symptoms are not such as would be recognised as forbidding the use of the cow for dairy purposes. Clearly, further inquiry is wanted to show whether the animal is liable, without such artificial inoculation, to suffer from similar ailment proper to her own system.

During the year inquiry was made by Dr. Blaxall into the sanitary aspects of British immigration and emigration practice, the more immediate occasion of the inquiry being representations from the United States that small-pox was believed to have been imported into that country by immigrants from Europe. Dr. Blaxall's inquiry took into account the movements of British and Irish population to various colonies as well as to foreign countries, and also considered the practice of emigration from the Continent of Europe to the United Kingdom and across Great Britain on the way to North America. His report shows a great amount of intelligent forethought bestowed upon the business of immigration and emigration in its commercial aspect, and a great and always increasing amount of solicitude given by those who undertake the responsibilities of directing emigration to the health of emigrants as well as to the more obvious conditions of their comfort. But Dr. Blaxall points to the lack of organised relation between shipping companies and sanitary authorities, and to the need for a variety of measures of co-operation among these bodies. He is strongly of opinion that there should be regular medical inspection of foreigners landed in English ports, since, although the quantity of preventable sickness spreading in emigrant ships leaving the United Kingdom, or transmitted through their agency, cannot be reckoned as large, the arrangements made for detecting infectious disease among persons arriving on our shores from continental countries appear to be defective.

The published researches of the department, as the result of its expenditure of the sum annually granted to it for 'Auxiliary Scientific Investigation,' are, it must be confessed, not on this occasion of a specially important character. Dr. Klein perseveres in his efforts to reproduce the results attained by M. Pasteur in the production of prophylactic 'vaccin' for different diseases, with the intention of further testing the expectation held out by M. Pasteur and others of a general law applicable to all kinds of virus, that it may be possible to produce for every infective virus an attenuated form of it which shall be capable of inoculation into susceptible animals, availing to produce in them a modified form of the infection protective thenceforward against serious attack of the disease. Again, experimenting with the bacilli of anthrax, Dr. Klein has extended his observations to sheep, but with results in the main negative. His experience on sheep was similar to his previous experience with rodents. Either he obtained no result whatever from inoculation with his artificial cultivate, or else the animal was killed by it, as it would have been by inoculation with the original anthrax. Of the specimens of artificial cultivates issued from M. Pasteur's laboratory as 'vaccin charbonneux,' those sold as 'premier vaccin,' proved in Dr. Klein's hands to be in most instances inert on the animals used for inoculation, viz., sheep, guinea-pigs, and mice; even on the rodents. They did not avail to protect them against death by subsequent inoculation with anthrax material; while the animals that were affected at all by this premier vaccin were affected fatally by it. The effects of inoculation with the 'deuxième vaccin' are more intense, but otherwise were similar to those observed in the use of the 'premier vaccin.' Either the animals were affected very little or not at all, and were left as susceptible as before to the fatal disease, or else they were killed by the anthrax which the 'deuxième vaccin' itself produced. From these results Dr. Buchanan draws the conclusion that 'obviously the particular specimens had not the power claimed for them, of causing a modified and productive form of anthrax, and it cannot but be inferred that the substances issued from M. Pasteur's laboratory are extremely uncertain in quality.' And he goes on to say that 'probably the conditions for the manufacture of a true attenuated anthrax virus are numerous, and are not all understood even by M. Pasteur himself; and this makes it more a matter for regret that the precise details of the methods which he adopts are not yet published by M. Pasteur for the information of his fellow-workers.'

The only other part of the scientific papers that needs notice is a very learned and suggestive paper by Dr. Burdon Sanderson, on useful lines of research concerning infection and disinfection, in which he defines the objects sought to be attained by the use of disinfecting agents in the light of the recent advances in the knowledge of the affinities and of the probable nature of the matter of infection. Dr. Sanderson points out that research after substances endowed with disinfective powers may be expected to aid to a better understanding of the nature of infective actions themselves; and he indicates, from the standpoint of our present knowledge, the directions which may best be followed for the discovery of such agents, potent for the control alike of septic and of specific contagia outside the living body; and, perhaps, antagonistic to the operation of contagia within the body. It is eminently satisfactory to learn that some sustained researches upon the lines indicated in Dr. Sanderson's memorandum are now being made into the behaviour of some of the better known contagia, in presence of various colytic agents.

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THE
SANITARY RECORD.
JUNE 16, 1884.

The Editor will be glad to receive, with a view to publication, announcements of meetings, reports of proceedings, and abstracts or originals of papers read before the members of any sanitary or kindred association.

RIVERS POLLUTION.

It has been said that the Rivers Pollution Prevention Act of 1876 has proved to be practically useless. A very few cases, so far as we are aware, have been brought into Court under it. The Corporation of Stoke recently sued the Corporation of Burslem under the provisions of sections 2 and 3 of the Act for having polluted a brook called the Foulhey Brook, by sending sewage matter into it. At the trial, which took place before Mr. Jordan, the County Court Judge, at Burslem, the defendants took the objection that another action had been brought against them by the Duke of Sutherland in respect of their pollution of the Foulhey Brook, and that consequently the Corporation of Stoke had no power to bring their action. The objection was taken under section 13 of the Rivers Pollution Act, the words of which are as follow :—'Proceedings shall not in any case be taken under this Act for any offence against this Act until the expiration of two months after written notice of the intention to take such proceedings has been given to the offender; nor shall proceedings under this Act be taken for any offence against this Act while other proceedings in relation to such offence are pending.'

It appeared that the condition of the Foulhey Brook had been a matter of complaint and a subject of litigation for many years past; that the Corporation of Stoke gave the required notice of action; and after it was given, but before its expiration, that the Corporation of Burslem had on February 7 this year consented to a decree in the action brought by the Duke of Sutherland in the High Court of Justice, binding them with all due diligence, and in any case within six months from that date, either to execute works which would obviate all further pollution of the Foulhey Brook by the sewage of the borough of Burslem, or otherwise effectually to prevent and put an end to such pollution. The action in which this decree was made was brought under the provisions of the Public Health Act, which forbids any local authority from making or using any sewer, drain, or outfall for the purpose of conveying sewage or filthy water into any natural stream or watercourse. It was alleged to be a friendly suit brought for the protection of the Corporation of Burslem, and no evidence appears to have been given as to whether effectual steps were being taken to carry out the decree. The six months of course have yet some time to run. After a good deal of discussion, the County Court Judge held, as it seems to us on the facts before him he was bound to do, that the action brought by the Duke of Sutherland was a proceeding in relation to an offence under the Rivers Pollution Prevention Act, and consequently that the action brought by the Corporation of Stoke was wrongly brought, and he dismissed that action with costs, but stayed execution to allow of an appeal; whether it will be presented or not we are not aware.

The case is of importance as illustrating the position of those who wish to prevent water from becoming polluted. At Common Law any person whose proprietary rights were injured by sewage or other foul matter being sent into a stream or pond could always bring an action against the person who caused the injury, and, if he proved his case, might recover damages and obtain an injunction to prevent the continuance of the injury. Such actions are, however, usually expensive and troublesome; and a plaintiff might fail from want of proof of injury to himself, although the fact of pollution could not be disputed. Under the Sanitary Acts, local authorities are empowered to take proceedings for preventing the pollution of water in or near their districts, but such proceedings may be a costly matter to the rates, and local authorities are often reluctant to take them. The Rivers Pollution Prevention Act was intended to facilitate proceedings being taken. Jurisdiction by it was given to County Courts, not only to impose penalties, but also grant injunctions restraining the continuance of a pollution; and either the sanitary authority or any person aggrieved may institute proceedings. But the powers given by the Act are greatly curtailed by provisoes and safeguards as to the manner of putting them in force, of which section 13 above referred to is an example. Of course where an action has already been brought for the purpose of abating a nuisance, and is being prosecuted effectively, it would be vexatious and cause unnecessary expense to allow another action to be brought simultaneously in respect of the same facts. But section 13 undoubtedly exposes a party aggrieved who *bonâ fide* brings an action to abate a nuisance, to defeat on the ground that a collusive action has already been brought for the protection of the wrongdoer. As proceedings are not conducted with much formality in County Courts, the defendant need not give any intimation of such a defence until his case actually comes on for trial, and the plaintiff may find himself beaten by a technical defence of the existence of which he was ignorant. As was decided by the Court of Appeal, in the year 1879, in the action brought against the Brighton Aquarium Company, to recover penalties for keeping open on Sunday, a judgment obtained by covin and collusion is no judgment, and may be disregarded. But it is not always easy to prove that the previous action is collusive, and such proof is especially difficult in a case where the fact of such action having been brought is unknown to the plaintiff up to the time of trial. The case of Stoke against Burslem shows how difficult it is successfully to bring an action under the Rivers Pollution Act, and how inefficient is the protection afforded by our law to the purity of streams.

Massacre of the Innocents.—Dr. Danford Thomas, holding an inquest at the Clerkenwell Coroner's Court recently, on a child suffocated as it was sleeping in bed with its parents, said that he had held about 150 inquests a year on children who met their deaths in that way, and cautioned parents against a practice which was fraught with so much danger.

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WATER RATES.

DURING the past month but little if anything has been done to settle the question of water rates, but the public are becoming awake to the fact that Mr. Dobbs has not secured a permanent reduction for every one. The effects of the policy announced by the directors of the Grand Junction Company, and no doubt pursued by the other Companies, of revising their charges so as to ensure getting as much in each case as they legally can, are becoming apparent; and many householders have complained that the water rates claimed from them are larger than they ever were before. The newspapers have reported several applications to magistrates for summonses against the companies to settle the amount to be paid; and according to the reports, many of the applicants have extremely vague ideas as to their position. For instance, a gentleman is reported to have obtained a summons against the East London Company for overcharges, the chief items of his complaint being that the company had demanded payment for extras—viz., for two closets, 12*s.*; for bath, 6*s.*; and for service, 18*s.* He said that he could not understand the meaning of these extra items, but they are authorised by the company's Act, section 75, and in all probability they have always been charged, but until the water question began to occupy public attention he had never examined his water bill, and had paid them without notice.

In another case a claim was made against the same company for a reduction of the rateable value of premises on the ground that the water was supplied for domestic purposes, and that the rent of the premises was enhanced by their being valuable for business purposes. The occupier contended that his water rates should be based on the value of his house, if used as a dwelling-house, irrespective of the shop. There is nothing in the Waterworks Acts to support such a contention, and it is needless to say that it failed. To have given effect to it would mean a very serious diminution of the value on which the Companies are entitled at present to base their charges.

The water companies assert, and as we have already pointed out, assert with justice, that, though the annual value on which they are entitled to base their charges has to be ascertained according to the same computation as rateable values for the purposes of the poor rate, they are not bound by the parochial assessment. The overseers and assessment committees are the persons to settle the value of premises for the purposes of rating, but not for the purposes of ascertaining the amount to be paid for water supply; that must be settled between the company and the ratepayers by agreement, or in case of dispute be determined by two justices or a stipendiary magistrate. Each party is not only entitled but bound to form his own estimate of the value; but, unless the other party chooses to accept it, that estimate is not binding on him. The water companies in many cases have estimated the value of premises at a figure considerably above that given by the parochial assessment, and no doubt in many cases have obtained payment of rates on the amount fixed by themselves, because the ratepayers have not disputed the claim. Some persons have complained of this as unfair, and say that the companies ought not to be entitled to make their own estimate and charge according to it, but should be bound to obtain approval of their valuation before making any charges. We cannot agree with this. It never was supposed or intended by Parliament or by any one else that the value of every house was to be contested. If one party makes an estimate and the other acquiesces in it, it is presumably fair, and it would be most undesirable that such cases should be forced before a tribunal where the parties would be tempted to dispute them. The grievance which the ratepayers have is that their property should be subject to two different assessments by different bodies for the purpose of ascertaining its value; but it cannot fairly be said to be unfair that parties interested should have a right to judge of the value for themselves, so long as the other parties are not bound by the valuation until it has been decided to be correct by an impartial tribunal. It is quite true that the water companies are powerful corporations, and, if they enter into a legal contest with an individual ratepayer, have an advantage; but that is an element inseparable from all contests between individuals and corporations, and is not confined to disputes about water rates.

The companies have in some instances lately, in valuing property, fixed the value below the rateable value instead of, as in most cases, above it. This seems *bonâ fide*, but some ratepayers have discovered that the lower value may mean a higher water bill. According to their Acts, the rate of charge varies inversely with the value of the premises, and a diminution of a pound or two in the valuation may reduce the premises within the value on which a higher percentage may be charged. The companies have, of course, no more right to undervalue than they have to overvalue premises for their own profit, and any ratepayer who objects can refuse to pay their charges and have the value ascertained in the way prescribed by law. Now that public attention has been directed to the question, and associations have been formed for the defence of the interests of the ratepayers, we do not believe that any cases of flagrantly wrong valuation will be allowed to pass unchallenged, but there may probably be many cases where individuals will deem themselves aggrieved, though not sufficiently to be worth fighting. The present system is vexatious, and the sooner a better one can be devised, the better for all parties. We fear, however, that this cannot be expected very soon, especially as the Bills which have been introduced into Parliament with the object of settling the question appear to make no progress, and effective legislation during the present Session appears improbable.

M. GARNIER demonstrates that the use of impure glucose in making syrups, jams, beer, and cider; also the use of sulphuric acid and that of calcium sulphate in the process known as *plâtrage* (plastering), introduces arsenic into articles of food.

A SWIMMING BATH FOR WHITECHAPEL.—The Rev. S. A. Barnett, of St. Jude's, Whitechapel, and Mr. F. D. Mocatta, make an appeal for a new swimming bath for this crowded locality, where there are already baths and washhouses established by the help of the late Rev. Charles Kingsley. The vestry of Whitechapel has agreed to undertake the expense of keeping up the bath and supplying it with warm water, but justly shrinks from throwing the whole cost of construction on the ratepayers of a parish in which a penny rate produces only 650*l.* A thousand pounds is wanted to complete the sum necessary for the building of the bath, and this is asked for by voluntary contributions. It is a pleasant sign of the times to see Christian clergymen and orthodox Jew working together for the common weal.

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RAILWAY FACILITIES FOR ARTISANS.

MOST of those who have gone at all deeply into the question of the best ways to relieve the overcrowding of the central and more densely-populated districts of the metropolis have been forced to the conclusion that part at least of the mischief might be averted if adequate facilities were afforded to workmen for getting cheaply and expeditiously into the suburbs by railways or other means of locomotion. A workman is practically bound to live within a short distance of his work-place, unless he can be conveyed to and from a suburban home in a short time and at a very moderate expense. Railway companies do, indeed, make a great show of virtue with their 'workmen's trains,' but these run at unearthly hours of the morning, and the return journey is subjected to a variety of disabilities which are very irksome. Hence many thousands of artisans, who might possess a neat and healthy home of their own in a decent suburb for the same expense as they now incur for one or two miserable rooms in a stifling court in the slums, have perforce to be content with the latter, owing to the inconvenience and expense of railway travelling.

A further difficulty arises from the fact that several of the large railway companies decline, for reasons best known to themselves, to issue third-class season tickets. The practical result of this is that a workman, who cannot put aside at one time enough money to equip himself with a second-class season ticket, is mulcted for his daily third-class ticket of a sum which in the end amounts to considerably more than that for which he could have travelled regularly in a superior class of carriage. Mr. Chamberlain has just presented to Parliament a Bill for the better regulation of railways, which goes into such details as requiring returns of signalmen who work more than a certain time, and fines companies for trains more than fifteen minutes late. It would not in the least strain the principle of this Bill to make it compulsory upon every company to issue third-class season tickets on equitable terms. Everyone does not want to get to his work at six o'clock in the morning. People just as needy as bricklayers and machinists would be very grateful for cheap carriage to and from their homes; and, putting the question upon its lowest ground, we really fail to see how the companies could lose by so reasonable a concession as third-class season tickets.

It may be worth while to give a practical illustration of the hardships of the present system. The Artisans', Labourers', and General Dwellings Company is now engaged upon developing Noel Park, near Hornsey Station, an area of 100 acres, to contain 2,600 houses, about a thousand of which will be let at 6*s.* or 7*s.* 6*d.* a week, including taxes and water. This estate was mainly purchased because of its nearness to the Great Northern main line.

Hornsey Station, which is about ten minutes from the estate, and four miles from King's Cross, would be largely used by passengers who would migrate from the slums in the neighbourhood of the Great Northern Terminus, if facilities for cheap transit were provided there. If a man living at North Park is too poor to pay down the sum required to purchase a second-class three-monthly ticket, which would cost him at the rate of 4½*d.* a day, he is compelled to pay for a third-class ticket 8*d.* a day, or 4*s.* a week, unless he is prepared to leave home before five o'clock in the morning. We have no hesitation in describing this as anomalous and unjust. The same advantage which is given to the first and second-class passengers, if given to the third-class at a price proportionate to the cost of single tickets, would reduce the cost of transit from 8*d.* to 3*d.* a day, which would make all the difference in the world to an artisan who has to look hard at every penny before he spends it. These considerations were pressed upon the Great Northern directors on the 2nd ult. by a deputation which included the Duke of Westminster, the Earl of Shaftesbury, Viscount Lymington, M.P., Hon. Cecil Ashley, and Mr. R. E. Farrant, the Deputy Chairman of the Artisans' Dwellings Company, and a promise was made that the question should be considered.

We have given the case of Noel Park as an example, not because the matter affects one company or one line of railway, but because it shows very well the difficulties which now lie between the coming together of the London artisan and a well-found, wholesome, suburban home. He may have, at a place like Noel Park, a good four-roomed cottage, with scullery and front and back gardens, and with taxes and water paid for him, for six shillings a week. But he cannot pay four shillings a week to get to it. It is evidently quite impossible to relieve the overcrowding of the working classes in London by the removal to the suburbs of those who appreciate a comfortable home, unless the facilities given to first and second-class passengers are also given to the third-class passengers. And why not? The third-class traffic is the backbone of most companies' revenue returns. Those who travel in the superior classes of carriages have ways of bringing influence and pressure to bear upon directors that third-class passengers have not. Parliament is the proper champion of the rights of the latter, and it has only to threaten a withholding of the 'further powers' for which companies are annually asking, to secure the concessions required. We shall be surprised if the Royal Commission now sitting on the Homes of the Poor does not recommend some considerable extension of railway facilities for artisans desiring a suburban home. Their removal will leave more space in the overcrowded courts of central London for the nomadic and shiftless 'residuum' with whom the respectable poor man is now compelled to herd, and it will thus be a measure of relief to both classes. Railway companies have in their hands the power to develop in outer London a traffic which would be enormous, which would be remunerative, and which would, more than anything else, solve the difficulty of overcrowding, so far as regards that immense portion of the working classes who would live in a home, only obtainable in the suburbs, if they could get to it.

ART AND SCIENCE.—The new organ at Westminster Abbey is blown by an 'Otto' silent gas-engine.

MESSRS. HAYWARD TYLER & CO., of Whitecross Street, London, who five years ago erected the extensive sewerage pumping machinery of the Twickenham Local Board for raising one and a half million gallons daily to a height of 60 feet (or 100 feet if required), have now contracted to supply and erect another large steam pumping engine in the same works, to meet the increased demand of the district. The pumping machinery already at work has performed its functions since its first starting without a single hitch, in spite of exceptional demands upon its capacity during wet seasons. Interesting drawings of this machinery are exhibited at the International Health Exhibition.

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SMOKE ABATEMENT.

A RENEWED effort is being made this time by Lord Stratheden and Campbell to relieve this murky metropolis of ours from some at least of the black pall of smoke that now overspreads us. The noble lord has introduced into the Upper Chamber a Bill to amend the law relating to Smoke Nuisances, which will at any rate afford an opportunity for the further ventilation of the question.

Briefly, the Bill proposes to give the Metropolitan Board of Works and the City authorities powers to supervise the heating systems of all houses, similar to those which they possess for supervising the sanitary arrangements of dwellings. Local authorities are to be empowered to make by-laws for the restraint of smoke, subject to the approval of the Home Secretary, and the provisions of the Sanitary Act of 1866, dealing with smoke nuisances, are to be extended so as to include dwelling-houses. The Smoke Abatement (Metropolis) Acts, 1853-56, are likewise to be extended to the whole of the Metropolitan Police area; all the trades and furnaces not at present included are to come under the provisions of these Acts. Without anticipating the ultimate outcome of the measure, it may be useful to note the manner in which the existing Smoke Nuisance Acts are carried out. As at present administered in the metropolis, they seem calculated rather to increase than to diminish the evil. From a return prepared at the instance of the Smoke Abatement Institute, it appears that during the five years, 1877-81, the average fine inflicted for first offences below the legal minimum of 40*s.* was 7*s.* 11*d.*, whilst, for second and subsequent offences, the legal minimum of which is 80*s.*, the average fine was 10*s.* 1*d.* In Lambeth alone, which is notorious for its murky atmosphere, the fines ranged from 2*s.* 6*d.* to 10*s.*, although in some instances former convictions had been proved. The indifference with which many manufacturers receive the mandates of the police is, therefore, scarcely to be wondered at, when they are followed by such trumpery fines. And this, unfortunately, is a practice by no means common to the metropolis. Referring to the subject in a recent report on the health of Newcastle-on-Tyne, Mr. Armstrong, the health officer, states that he was assured by one of the largest smoke producers in the borough, that he found it more worth while to pay an occasional fine than to be at the inconvenience and expenses of putting in fresh apparatus. Instances of this kind here are plentiful enough, and they all tend to show that the admittedly defective state of the legislation is aggravated by the lax administration which it receives at the hands of the magistrates. On the part of sanitary authorities also the law receives but little practical recognition, for we continually find health officers reporting that their districts are 'deluged with smoke'; whilst but few large manufacturing towns have appointed inspectors whose sole duty should be to examine and report on smoke nuisances. At Manchester the Town Council have obtained powers in a local Act to inflict a continuing fine of 10*l.* per day for offences against their smoke regulations; but it remains to be seen how far these powers will be exercised.

NATIONAL HEALTH SOCIETY.—The Worshipful Company of Drapers have been pleased to grant a donation of twenty-one guineas to the National Health Society, 44 Berners Street, W., for the diffusion of sanitary knowledge.

NOTES OF THE MONTH.

SANITARY PROGRESS IN JAPAN.

PERHAPS the most interesting of all recent developments of the science of hygiene is that which is taking place in Japan. The ancient and interesting people inhabiting this part of the world have made astounding strides during the last twenty years, and amongst other imitations of Western civilisation they now boast a Sanitary Bureau, making its reports to a Home Secretary with an unpronounceable Japanese name. From a recent report of the directors of the Sanitary Bureau, couched in idiomatic English and excellently printed, we take the following particulars of the temporary regulations issued by the Government for the prevention of the spread of cholera. Whenever a physician is called upon to treat a cholera patient he is required as soon as possible to notify the occurrence to the officers of the district or village, or to the nearest police officer, who must in turn notify the fact to the highest local authority. The notification by the physician is to be made within twenty-four hours after he has seen the patient. In private houses, cholera patients must be confined to one room, which no one, except the nurses, are permitted to approach. Nor are the members of the family allowed to communicate with the outside world until full disinfection has been performed, either after the death or recovery of the patient. At the entrance to those houses in which there is a cholera patient, a paper setting forth the fact is to be prominently posted, and no one except those who have urgent business are admitted. The notification cannot be removed without the sanction of the inspecting officer. In certain circumstances the governor of a district may forbid the assembling together of people as at religious festivals, in theatres, &c., whenever the disease is raging with severity. Other provisions relate to the precautions to be observed when removing patients, to the performance of disinfection, burial, &c., the erection of hospitals, and the removal thereto of persons who cannot be properly treated at home. These regulations, if enforced with anything like strictness, ought to prove effectual in keeping the dreaded cholera at bay; and they may well excite the envy of sanitary reformers here, 'cabined, cribbed, confined' as they are by vested interests and the assumed sanctity of the Englishman's home.

THE COST OF MILK ADULTERATION.

SOME unoccupied person with a turn for figures has been calculating the amount of the disguised additional water rate which the British ratepayer pays annually for the water at fourpence or fivepence a quart, which is surreptitiously served out to him in his daily allowance of milk. The extra money squeezed out of him by the water companies under successive reassessments of property is a mere bagatelle as compared to this. We shall not attempt to speculate upon the total sum thus unwittingly paid by the long-suffering householders in the course of a year; but some figures given by Mr. Wynter Blyth in a recent report on St. Marylebone may give some notion of the magnitude of the question. Mr. Blyth estimates the milk supplied to Marylebone to amount to 18,625 quarts daily, representing money value of at least 310*l.* per day, or 113,150*l.* per annum. In

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1882, one-third of the samples of milk analysed were found adulterated; in 1883, of the 23 samples chemically examined 34·7 per cent., or more than a third, were adulterated with quantities of water from 6 to nearly 30 per cent. Taking the milk supply of the parish, good and bad, the 18,625 quarts are made up of 16,931 quarts of genuine milk, and 1,694 quarts of water; hence the inhabitants buying this water at the same price as genuine milk lose about 10,000*l.* a year. It is curious to watch, Mr. Blyth observes, the change the composition of the milk undergoes, according to the activity of those whose duty it is to collect the samples. Directly a raid is made in any part of the parish on milk dealers, the milk barometer rises and continues high for some little time, but gradually falls to the old standard as the alarm dies away. The obvious remedy for this is a more vigorous administration of the Food and Drugs Act. Although the population of St. Marylebone amounts to little less than 155,000, but 155 samples were submitted for analysis during the past year, and of these, including 25 samples of canned fruits, 46 were found adulterated.

SMALL-POX AND RAGS.

We continue to receive particulars as to the outbreak of small-pox at Ugborough and Ivybridge (see p. 550), which seems to show that a considerable amount of blame attaches alike to the owners of the paper-mills where the infected rags exist, and to the local sanitary authorities. One of these, the Local Board of Ivybridge, sits with closed doors, and the other, the rural authority, seems disinclined to exercise its statutory powers for dealing with the outbreak. Cornwall monopolises, as it is, much more than its fair share of the time of the Medical Department of the Local Government Board, or else it would be a real charity to the district to send some inspectors down who could direct the activity of the authorities into useful channels. We have not heard as yet that the owners of the paper-mill are disinfecting their rags, and, meanwhile, dropping cases of small-pox keep starting up in the vicinity. Why does not the authority have the courage of its convictions, and prosecute the owners under section 126 of the Public Health Act for the exposure of infected rags?

COMPENSATION FOR COMPULSORY SUSPENSION OF BUSINESS.

Whenever the time shall arrive for our legislators to consider the revision of the Public Health Act, they will find ample scope for amendment in its provisions relating to infectious disease. A notable defect, and one which is frequently referred to by health officers in their periodical reports, is that sanitary authorities cannot legally recompense shopkeepers, in whose family an infectious disease exists, for closing their shops or temporarily suspending their business. Thus, Mr. Karkeek, in reporting on the health of Torquay, observes that a difficulty he is constantly meeting is the objection some of the poor have to let others know that they have infectious disease in their homes, for fear it should lead to some little business being stopped; for instance, laundry work, mangling, needlework, milk-selling, and small shop-keeping. These are occupations generally followed by the wife, while the husband is out at work; and if the earnings from these sources are cut off it means a very serious diminution of supplies at a time when they are most wanted. Shops of all kinds, and notably businesses of this description, afford a ready means for the dissemination of infection, and, as Mr. Karkeek observes, where, on account of the public weal, people are debarred for a time from pursuing certain trades and callings, sanitary authorities ought to have the power to compensate them.

THE MANCHESTER AND SALFORD SANITARY ASSOCIATION.

The success which has attended the formation of this excellent association is, perhaps, without a parallel; and it is a noteworthy fact that during the past year the committee received several applications from sanitary workers at home and abroad asking for advice as to the formation of similar societies. In few places, perhaps, could an administration so powerful or effective be got together as at Manchester, but there is abundant evidence forthcoming to prove that smaller and less pretentious combinations have produced excellent results. During the past year the committee did not relax their painstaking efforts to secure an advance in the social and sanitary circumstances of the inhabitants of the district they supervise. The Corporations of Manchester and Salford were memorialised to take comprehensive action for the improvement of cottage dwellings, and to provide additional open spaces and playground accommodation. Petitions were also presented with a view to securing the licensing of midwives, the control of milk supplies, and the regulation of the sale of patent medicines; but these, like the former, have so far been attended with negative results. The Manchester Corporation have, however, indirectly acceded to the prayer of the committee for the analysis of articles of food at popular prices, in issuing a notice to the effect that all persons desirous of having articles of food and drugs analysed free of expense should communicate with the sanitary officials. Although somewhat ungraciously granted, this is an important concession, and should do much to make the administration of the anti-adulteration Acts more effective. The systematic visiting of the poorer neighbourhoods led to the discovery and removal of many nuisances that might otherwise have escaped attention, and the course adopted during the past two years of giving a series of health lectures for the people was again carried out. The results attending the work of the association must of necessity be slow in manifesting themselves, but already the committee notice a growing public interest in questions of hygiene, temperance, and thrift. Included in the report under notice is that of the Manchester and Salford Noxious Vapours Abatement Association, which contains a record of the work of the committee during 1883. They regret that so far the Salford authority cannot be prevailed upon to provide additional inspectors for the suppression of smoke nuisances, which, as we have shown in these columns (see Sanitary Record, Vol. xiv., p. 408), is much needed; but they announce with satisfaction that the city council of Manchester have, by a provision in a local Act obtained last session, ample power to inflict a continuing fine of 10*l.* per day for offences against their

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smoke regulations. With a view to effecting a practical solution of the whole question, efforts were made to secure the establishment of a show-room at Manchester for the exhibition of smoke abatement appliances; but at the date of the report the decision of the council on the application was not known. Should the petition be successful, the association will thus have at their disposal a convenient mode of attracting public attention to a very serious evil.

HOUSE-LETTING AND INFECTIOUS DISEASE.

OUR Law Report of this month (see page 606) contains a case which will no doubt be often quoted in the future as governing the question whether, for the purposes of letting, a house can be held to be habitable if there has existed in it, within a short period before the date of hiring, any case of infectious disease. Common sense would certainly say not; and in the case of *Bird* v. *Lord Greville* the law has for once followed common sense. Lord Greville was in the position of many other noblemen in desiring to hire a furnished town house for the season. His wife examined a house that she thought would suit her, and entered into an agreement with the house-agent for its hiring for a period of fourteen weeks from March 28, 1883. On the very day that the agent accepted her ladyship's offer, a child in the house sickened with obvious measles. A few days later, when Lady Greville again came to see the house, she found this child upstairs in a darkened room, but was assured by the nurse that there was 'nothing infectious.' Subsequently, her ladyship learnt by accident the nature of the child's complaint, and thereupon telegraphed to the agent declining to take the house. A suit against Lord Greville was accordingly entered for fourteen weeks' rent of the house, and it was contended that at the date when the tenancy should have begun, namely March 28, all danger of infection had passed, since the child was removed on March 21 and the usual disinfecting processes were carried out. A bad feature of the case, and one on which the judge strongly commented, was the fact that the plaintiff claimed the whole rent, although the house had, as a matter of fact, been let for a considerable portion of the time for which rent was claimed; and this, no doubt, largely influenced his lordship's decision in favour of the defendant. The bare question, irrespective of the special circumstances of the case, whether a house that has admittedly been thoroughly disinfected according to received ideas, is fit for occupation a week after, is one which we should find it very difficult to answer satisfactorily. But no doubt Lady Greville exercised a wise discretion in declining to take her young family into such a house, and the result of the trial shows that she was within her legal right in doing so. Indeed, had she chosen she might have retaliated upon the house agent by prosecuting him under section 56 of the Sanitary Laws Amendment Act, 1874, which imposes a penalty of 20*l.* or hard labour for a month, on 'any person letting for hire, or showing for hire, for the purpose of letting for hire, any house or part of a house, who on being questioned by any person negotiating for the hire of such house or part of a house, as to the fact of there being, or within six weeks previously having been therein, any person suffering from any dangerous infectious diseases, knowingly makes a false answer to such question.' We should like to see this clause acted upon a little oftener than at present, for house agents appear to consider such trifles as the state of the drains, or the existence of disease, to be outside their province altogether.

SANITARY STATE OF VENTNOR.

NEARLY two years ago (*see* SANITARY RECORD, Vol. xiv., p. 62) we had occasion to refer to the sanitary circumstances of Ventnor, and to the efforts that had been made by the local authorities to place the district in the first rank of health-resorts. Judging from the last report of Dr. Woodford, the health officer, the Town Council have not relaxed their efforts in this respect, and the statistics recorded during 1883 are of a very satisfactory nature. Excluding the deaths of visitors, the general death-rate represented 12·3 per 1,000 of population. With the exception of two mild cases of typhoid fever, which are satisfactorily accounted for, there was no occurrence whatever of zymotic disease. Few health-resorts can boast so clean a bill of health; but it is to be regretted that the district remains unprovided with any isolation accommodation. From its position as a health-resort, Ventnor is peculiarly exposed to the importation of infectious disease, and the fact that in former years it has escaped a visitation does not make the need for a hospital any the less obvious. There was last year a notable reduction in the mortality from chest affections, the deaths numbering 8, as compared with 17 recorded in the previous year. Consumption was fatal to 47 persons, of whom 45 were visitors. The registration of lodging-houses, whose sanitary virtue is vouched for by the Local Board, does not proceed very rapidly; but the fault seems to lie with the keepers of such houses, who cannot be brought to see that they are adopting a suicidal policy in resisting the well-intentioned efforts of their sanitary guardians.

SPREAD OF SMALL-POX IN HULL THROUGH A SCHOOL.

AN illustration of the danger of the spread of infectious disease through school congregation comes to us from Hull. Usually it is scarlatina or measles that is thus spread: on this occasion it is small-pox. On May 2 the medical officer of health of Hull visited a house situated in a populous part of the town, where an infant, aged eighteen months and unvaccinated, had died on the previous evening from small-pox. The mother stated that the child had been ill some ten days, and had been treated by a local chemist for measles. The other children of the family had been attending some Roman Catholic schools on the day on which the child died, and they and their mother, who had been hawking goods from door to door, have been admitted into the Borough Hospital, suffering from small-pox. Since that time, 17 children (15 girls and 2 boys), varying in ages from six to eleven years), attending the schools in question, have been admitted into the hospital, suffering from small-pox. They had all been taken ill on or about the same day, and had been in the same classes as the family mentioned above. Three of the children were unvaccinated. The vaccinated children have had comparatively mild attacks, and it is remarkable that the youngest

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children have more or less escaped the infection, although similarly exposed. Immediately the outbreak became known the schools were closed, and they and the chapel in connection with them were thoroughly fumigated.

Other cases of small-pox have been traced directly to this source. A young man, engaged in a pawnbroker's shop, contracted the disease in the pursuit of his ordinary business. Parcels of clothing, &c., deposited from infected houses, have been carefully isolated, the whole premises have been fumigated, and every precaution has been taken against the spread of the disease. It has been decided to erect a hospital tent for the better treatment of small-pox. But it is equally important that facilities should be given for the general performance of vaccination and re-vaccination on unprotected persons, and that the public should be encouraged to avail themselves of these facilities.

THE LOCAL GOVERNMENT BOARD.

WE understand that a considerable re-organisation of the clerical establishment of the Local Government Board has just been completed, and that a large increase has been made in the superior appointments of the office. For some years the Local Government Board has been under the disadvantage of having piled upon it increased and increasing duties which grow daily in intricacy and responsibility. The work of the department requires for its proper performance qualifications which it is impossible to expect of a staff badly paid and with few prospects of advancement. In treating the clerks more generously, therefore, the Treasury have exercised a wise discretion; and as the old leaven of the Poor Law Board is dying out, we may expect in the future to see increased efficiency in the department. For although it is true that the mental characteristics of the nominal head of any office must, in a measure, re-act upon the staff generally, yet it is upon the permanent heads of departments that the success or failure of any Government office chiefly depends. The Local Government Board has now gathered round it a band of devoted workers whose traditions are of the best, instead of, as formerly, the worst; and it is of the highest importance that it should encourage good men to serve under its banner. No department of State has a greater power for good than the Local Government Board; but its influence should be felt, not seen, and to guide insensibly but effectually the counsels of the thousands of local authorities who are now under the sway of the Board, needs the most skilful and diplomatic administration.

SANITARY STATISTICS AT WHITEHALL.

THE resignation of Mr. Frederick Purdy of the office of Principal of the Statistical Department of the Local Government Board, after a service under the Crown of no less than 48 years, suggests a variety of reflections. If Mr. Purdy were to put his experiences into writing we might get an idea denied to the coming generation of the way in which things were managed when her present Majesty came to the throne. Those were the days before germs and bacteria and sewers and 'zymotics' were heard of. No troublesome figures about local taxation puzzled the heads of economists. Mr. Bumble then exercised imperial sway in the poor-houses, and no interfering inspectors popped in at inconvenient moments to taste the porridge or check the parish books. Mr. Purdy in his day has given to the world many millions of figures about one and another branch of Poor Law and sanitary work; but for the most part these have fallen flat upon an unregenerate and ungrateful public. We receive from time to time elaborate returns containing carefully calculated percentages of pauperism in this county and in that; and no doubt professed statisticians find great comfort in the imposing array of figures. But the average mortal pines for something a little more practical. Wanting always his mental food ready digested for him, he would like to have, for instance, some facts that would appeal to his unassisted intellect as to the practical outcome of the expenditure of the millions that local authorities have been so gleefully borrowing of late for their descendants to repay. So far as statistics can help us, and we need not stop to repeat the trite remark that 'figures can be made to prove anything,' there is by this time a sufficiently large accumulation of facts at hand to warrant some sort of general conclusion as to the results from a sanitary and necrological point of view of the expenditure on drainage, water supply, and the like of the last twenty years or so. But the figures as to expenditure are immured at Whitehall, and the figures as to deaths at Somerset House. Might it not be feasible, and would it not be very useful, that the two statistical staffs that own one supreme head should be amalgamated, or, at least, so co-ordinated that some sanitary statistics really worth having could be issued in a form to be understanded of the people? At present the mass of local indebtedness that goes on increasing after the fashion of a snowball sadly needs justification.

VACCINATION AND SMALL-POX.

IN view of the recrudescence of small-pox in the metropolis, the National Health Society have forwarded to the several metropolitan boards of guardians and sanitary authorities copies of a pamphlet which they have prepared on the subject of vaccination, and which they suggest should be left by the local officials, or by special temporary officers to be appointed, at each house within the several districts. This plan has already been carried out with marked success in certain metropolitan unions, and the general adoption of a similar course would no doubt lead to equally beneficial results. The pamphlet in question has received the honour of revision and amplification by the Local Government Board, who have, moreover, sanctioned in a number of cases the repayment of the expenses of its distribution out of the Metropolitan Common Poor Fund. The pamphlet may now, therefore, be fairly regarded as an official publication on the subject of which it treats. The society suggests that it would tend greatly to encourage vaccination and revaccination if the plain facts on the subject were brought home to every householder by a copy of the pamphlet being left at his door; and it would, moreover, materially assist the vaccination officers in the discharge of their often difficult duties. With the praiseworthy object of assisting as far as possible in the limitation of the epidemic, the society offers to supply copies of the pamphlet, as revised by the Local Government

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Board, at the cost of printing. In view of the extension of small-pox in the metropolis, it is clearly important that the local authorities should give the widest publicity in their districts to the actual facts on this very important question.

THE VENTILATION OF SEWERS.

AN important discussion has taken place amongst the members of the Sanitary Committee of the Newcastle Corporation relative to the utility or danger resulting from the placing of trays inside the ventilating shafts of the sewers of the city, which device the City Engineer had adopted to prevent the sewers being choked up by children putting sticks and other rubbish down. These trays have been placed a few inches below the surface of the ventilators to intercept the rubbish, leaving an orifice round the sides for ventilation. Several members of the Council have complained that since the adoption of these trays, the proper ventilation of the sewers has been greatly impeded, and noxious gases have thereby been driven into the houses, finding vent by the sinks and water-closets, thus accounting in some degree for the excessive death-rate for which Newcastle has recently attained such an unenviable distinction. Experience showed that these trays required constant attention or systematic cleaning, or they speedily got choked up with rubbish, the result being danger to the public health. The City Engineer and several members of the committee stoutly defended the use of the trays, which was strongly opposed by other members of the Committee. It was ultimately agreed that the general question stand over till the meeting of the Institute of Engineers in the North of England, which takes place next month; and it was also agreed that in the meantime the trays should be removed from a portion of the ventilating shafts at the east end of the city as an experiment, the result of which will be watched with much interest by the residents in that district. A large number of these trays have been affixed to the ventilators at considerable expense, and the ratepayers naturally do not view with complacency the expenditure of their money over inventions which are alleged to be worse than useless. Property-owners also complain bitterly of having to make frequent and costly alterations as experiments to suit the varying views of successive officials, such expenditure rendering property almost unremunerative.

THE CASE OF BRAWN-POISONING AT SCARBOROUGH.

A FULL report is before us of the inquest on the old man, William Newby, who died at Scarborough on May 22, under circumstances which gave rise to the belief that he had been poisoned by pork brawn. According to the evidence submitted, it appears that on Saturday evening, the 17th ult., the deceased and his wife, and a young woman named Todd, purchased some brawn at Whitaker's eating-house, Newborough Street. About ten o'clock they all partook of the brawn, noticing nothing particular in the taste, and shortly afterwards went to bed. No ill effects of a nature to attract attention were observed till the following morning, when the usual symptoms of poisoning were manifested. In the course of the day all the patients grew worse, suffering from diarrhœa, violent abdominal pains, and vomiting, and at 9 P.M. Dr. Walton was called in. His attention was specially directed to the male patient, whom he found in a depressed condition, slightly delirious, with cold, clammy skin, weak pulse, and dry, brown tongue. Directions were given as to treatment, and on the 19th Newby seemed rather better, but he was worse next day, and gradually became weaker till his death on the 22nd. Dr. Walton attributed the death to inflammation of the bowels, which he thought was caused by the brawn eaten. At the autopsy, thirty hours after death, it was noted that there were no external marks of violence, that the *rigor mortis* was well marked, and the body fairly nourished. There was evidence of old-standing pleurisy and valvular disease of the heart. The liver was nutmeggy and the spleen congested. The stomach contained about three teaspoonfuls of gruel-like fluid, and was congested along the smaller curvature. The small intestines were unmistakably inflamed. Dr. Taylor, the medical officer of health, who made the *post mortem* examination, was of opinion that the cause of death was inflammation of the bowels, and that eating unsound food would be liable to produce this. The eating-house keeper, from whom the brawn was obtained, stated that he sold it at 6*d.* a pound, and he believed half-a-pound had been purchased by Newby. The witness did not make brawn himself, but got it from 'Mr. Smith, of Bradford.' He got this lot the week before, he believed, and he was of opinion that there was none of the previous consignment left when this arrived, although there might be a little on hand. There would be two stone of brawn in the tin from which Newby was served. Up to the 17th half the contents had been sold. Witness had been in the habit of selling similar brawn from the same maker for the last three or four years and no complaint had been made previous to this. Probably 70 or 80 people had been served from the same tin as Newby, and about 27 had been taken ill after eating it. No complaint had been made to witness of the brawn having made people ill till the 20th, after which the remainder had been put aside. It was subsequently handed over to the police and a portion submitted for analysis. The medical officer of health deposed to three or four pounds of the brawn having been brought to him on the 20th. From its external appearance he was quite unable to condemn it as unfit for human food. The analyst, after a very careful examination, concluded that there was no metallic poison present in the brawn, but, on making an extract, a 'decided putrescent odour was observed.' In parts the flesh had undergone softening and was of a 'slightly greenish colour,' and had probably 'not been fresh when the brawn was made.' After ten minutes' deliberation the jury returned a unanimous verdict that the deceased's death resulted from inflammation of the bowels, caused by eating unwholesome brawn. Of course this was the only possible finding. The coroner, before the court rose, formally exonerated Whitaker from all blame, remarking that 'if any culpability attaches to anyone it is the manufacturer of the brawn.'

Thus has terminated a singularly interesting inquiry. As in nearly all previous cases of poisoning by cooked meat obtained from an eating-house it has been found that the toxic agent is not a metallic salt nor disease in the animal furnishing the meat, but some product of decomposition. What this

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product may be—an alkaloid, a fungus, a ferment—it is not desirable to discuss here. Let it suffice to remember that pork brawn and other cooked meats may be so unwholesome as to cause the death of the consumers and yet present no external appearance warranting a health officer in condemning it as unsound. Note also that the old rule for examining meat suspected of putrefactive change proved sufficient. Boiling a small portion of meat in a test tube, and searching for any change of colour or indication of softening, is not a laborious investigation, and will often afford evidence justifying the condemnation of meat apparently sound.

ANÆSTHETISATION OF ANIMALS BEFORE SLAUGHTER.

WE notice a report in the *Jewish Chronicle* on a series of experiments recently undertaken with the object of testing the practicability of using anæsthetics when slaughtering animals for human food. About twelve months ago Dr. H. Behrend was requested to arrange for the experiments, and he selected Mr. Roeckel (administrator of anæsthetics at Charing Cross Hospital), to whom was committed this inquiry, and who signs the report. Mr. Roeckel was so fortunate as to secure the services of the late Mr. James Shuter as his colleague in the work. The anæsthetic at once fixed upon by both these gentlemen as the most suitable was carbonic acid gas. It was an agent fulfilling the conditions which appeared to be required; that is to say, it was cheap, would not vitiate the flesh and other parts for food, nor interfere with the thorough emptying of the vessels from blood, and could be applied as easily as any other anæsthetic. The first step taken was to see animals slaughtered in the Jewish way in order to ascertain whether the *modus operandi* would interfere with the necessary apparatus. The animal (an ox) was skilfully cast, then the head was extended to make tense the neck by means of a chain passed round the lower lip, and finally the slaughterer with a single incision divided arteries, veins, windpipe, and œsophagus down to the vertebræ. After many experiments, including several preliminary ones on dogs, the conclusion was arrived at that anæsthesia could be readily produced, but that in its application to cattle, previous to slaughter, the following objections arise:—

1. The absolute necessity of the presence of some skilful person to decide the point when sufficient anæsthesia is arrived at; also to guard against anæsthetisation being carried too far and perchance killing the animal; there is no anæsthetic in existence which will not kill if it be only pushed far enough.

2. The necessary loss of time during the production of anæsthesia will, Mr. Roeckel thinks, prove a very great practical barrier. A certain time will be taken up in fixing the apparatus, varying in duration inversely as the skill of the person fixing and directly as varies the restiveness of the animal. Then the process of producing insensibility occupies a certain time, so that in round numbers the period which anæsthesia may be said to occupy will never be less than ten minutes, but may and probably will extend over double that time, and possibly more.

3. The expense, not of the anæsthetic agent employed, as that costs practically nothing, but of the maintenance of the apparatus in good working order. Everything depends upon the apparatus being tight, *air* tight; it must only be of a very simple description, but in its way it must be *perfect*; all the joints must be flawless, and the mouthpiece must be adapted so closely to the animal's snout that air cannot possibly enter. Now the primary outlay of such an apparatus would not be very great; but, by the end of the year, the instrument maker's bill for repairs would amount to something very considerable, thus practically making anæsthesia a not altogether inexpensive matter.

Dr. Behrend further reports that the idea of cruelty or suffering to the animals under the present method of slaughter by the Jews is emphatically negatived. He points out that the large arteries that supply the brain being divided, it must almost instantly be rendered so bloodless as no longer to be capable of receiving an impression of pain.

GOOD IN EVERYTHING.

'A WORKING MAN,' in a paper entitled 'A Remedy for Overcrowding,' published in the new magazine *Eastward Ho*, for May, thus finds good in that much-abused individual, the speculative, or, as he is less politely called, the 'Jerry builder.' 'Workmen's trains and rows of cheap houses growing up year by year on the outskirts, and driving the country farther away from the centre of London, are helping to solve the problem [of overcrowding]; north, south, east, and west the speculative builder and building societies are propagating houses at an enormous rate, and all seem to find eager tenants. It is to be feared that few of those brand-new houses, with some pretensions to adornment and convenience, will last out half the lease of the ground. I have lately, too, seen some new rookeries springing up—rows of houses that are smothering each other; and this ought to be stopped in time. Yet, with all drawbacks, no one who has travelled much in suburban third-class or workmen's trains but has noticed the wonderful improvement in health, respectability, and sobriety effected by planting out. Great as his sins may be, the speculative builder is a great public benefactor, a great decentraliser, spreading out wide borders to the City, and accomplishing an immense natural process of reform. He is drawing us out to regions where public-houses, glaring through the murky stuff that passes for air, do not exercise their fatal attractions at every step as we go home; where man of necessity becomes once more a domestic being, in his new little house with the bit of garden, where the girls grow up simple and pure, and our lads healthy and strong of limb, thank God! City life has been becoming more and more; men have been more and more gathered in to centres of wheels and steam power, till at last these beneficent influences begin to act the other way, and thus the compromise arose by which working men could live in the suburb and do their daily work in the City. Neither philanthropy nor legislation need intrude on this natural process—it will go on.'

A FOREIGN CRITICISM.

HERR STERNE-WEBER, of Vienna, is very favourably impressed by the excellent sanitary influence of games in English schools and colleges. He regrets that English health legislation presents many weak points, especially with reference to medical and sani-

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tary inspections of schools and colleges. He adds that, nevertheless, private sanitarians have taken the initiative, and have succeeded in organising so perfect a system of inspection, that these establishments are rarely attacked by infectious illnesses.

COPPER IN JAM.

D. V. GALIPPE, in a communication to the Société de Biologie, states that French jams and preserves contain the following proportion of copper, but adds that daily experience on a large scale shows that its presence is not dangerous :—

Gooseberries,	kilogramme,	gr.	0·0272
Cherries	,,	,,	0·0152
Plums	,,	,,	0·0248
Greengages	,,	,,	0·0160
Quince,	,,	,,	0·020
Apricots,	,,	,,	0·0176
Strawberries,	,,	,,	0 0112
Pears,	,,	,,	0·0136
Oranges,	,,	,,	0·0192
Pineapple	,,	,,	0·0224

TIIE SELF-PURIFICATION OF WATER.

THE much discussed question as to the purification of water in rivers 'by itself,' that is, by the mere fact of its motion, seems to have entered into a new phase. Dr. Pehl, at St. Petersburg, has recently made a series of bacterioscopic measurements on the waters of the capital, which are summed up in the last issue of the *Journal of the Russian Chemical Society* and translated in *Nature*. The water of the Neva itself appears to be very poor in bacteria, namely, 300 germs in a cubic centimètre. After heavy rains this number rises to 4,500, and to 6,500 during the thawing of the river. The canals of St. Petersburg, on the contrary, are infected with bacteria, their number reaching 110,000 in a cubic centimètre, even during good weather. The same is true with regard to the conduits of water for the supply of the city. While its chemical composition hardly differs from that of the Neva (by which they are supplied), the number of bacteria reaches 70,000, against 300 in the water freely taken from the river; and the worst water was found in the chief conduit, although all details of its construction are the same as in the secondary conduits. Dr. Pehl explains this anomaly by the rapidity of the motion of water, and he has made direct experiments in order to ascertain that. In fact, when water was brought into rapid motion for an hour, by means of a centrifugal machine, the number of developing germs was reduced by 90 per cent. Further experiments will show if this destruction of germs is due to the motion of the mass of water, or to molecular motion. The germs, among which Dr. Pehl distinguishes eight species, are not killed by immersion into snow. As the snow begins to fall it brings down a great number of germs, which number rapidly diminishes (from 312 to 52 after a three hours' fall of snow, on Jan. 21, 1884), while their number on the surface of the snow increases, perhaps in consequence of the evaporation of snow or of the condensation of vapour on its surface.

THE SALE OF IMPURE ICE.

THE State Board of Health of Connecticut, U.S.A., has introduced the following Bill, which has been passed by both branches of the Legislature :—

'Any person who shall sell, or offer to sell, for family or hotel use, any ice cut or taken from a pond or lake into which any sewer empties, or from such part of any river or other stream as is below and within two miles of the outlet of any sewer entering the same, shall be fined fifty dollars for each offence.'

THE PUBLIC HEALTH

DURING MAY 1884.

THE mean temperature at the Royal Observatory, Greenwich, during the month of May was 54°·3; it exceeded by 1°·7 the average May temperature in one hundred years, and was 1°·2 above that recorded in the corresponding month of 1883. An excess of temperature prevailed on fifteen days of the month, while on the other sixteen days it was below the average. The warmest day of the month was the 11th, when the mean was 64°·0, and showed an excess of 12°·6; the coldest day was the 5th, when the mean was only 45°·7, and 4°·0 below the average. Rain was measured at Greenwich on ten days during the month, to the aggregate amount of only 0·9 of an inch, which was less than half the average May rainfall in sixty-one years. During the first five months of this year the rainfall amounted to 6·7 inches, which was 2·1 inches below the average rainfall in the same period of sixty-one years. The sun was above the horizon during 482·1 hours during May, and 183·7 hours of bright sunshine were recorded at Greenwich; this amount almost corresponded with the average in the same period of the five preceding years 1879-83. South-westerly winds prevailed during the first half of May, while from the 18th to the end of the month the wind was easterly.

In the twenty-eight large English towns dealt with by the Registrar-General in his Weekly Return, which have an estimated population of nearly eight millions and three-quarters, 23,857 births and 13,903 deaths were registered during the four weeks ending May 31. The birth-rate, which had been 36·2 and 34·8 per 1,000 in the two preceding months, rose to 35·5 during May, and slightly exceeded that recorded in the corresponding period of last year. In these twenty-eight towns the lowest birth-rates last month were 26·1 in Brighton, 29·2 in Halifax, and 29·9 in Plymouth; in the other towns the rates ranged upwards to 42·2 in Cardiff, 42·6 in Birkenhead, and 46·8 in Sunderland. The birth-rate last month in London was 34·2, while it averaged 36·6 per 1,000 in the twenty-seven provincial towns.

The annual death-rate in the twenty-eight towns, which in the three preceding months had been 20·5, 22·0, and 22·1 per 1,000, declined to 20·7 during the four weeks of May, and was below that recorded in these towns in the corresponding periods of the two preceding years 1882-83, when it was 21·1 and 21·3 respectively. The lowest rate of mortality last month in these towns was 16·1 in Brighton. The rates in the other towns, ranged in order from the lowest, were as follow :—Derby, 16·0; Bristol, 16·7; Birkenhead, 17·7; Hull, 18·0; Salford, 19·2; London, 19·6; Norwich, 19·6; Huddersfield, 19·6; Sunderland, 20·1; Bradford, 20·4; Sheffield, 20·7; Leicester, 20·9; Newcastle-upon-Tyne, 21·1; Birmingham, 21·3; Nottingham, 21·7; Bolton, 27·1; Wolverhampton, 22·0; Portsmouth, 22·5; Cardiff, 22·9; Leeds, 23·3; Halifax, 23·5; Liverpool, 23·8; Oldham, 24·6; Blackburn, 25·3; Manchester, 25·6; Preston, 26·2; and the highest rate during the month, 27·1 in Plymouth. While the death-rate in London during May, as above stated, did not exceed 19·6 per 1,000, it averaged 21·7 in the twenty-seven provincial towns. The 13,903 deaths from all causes in the twenty-eight towns during the four weeks of May included 2,089 which were referred to the principal zymotic diseases, 5… which 647 resulted from whooping-cough, 633 from measles, 269 from scarlet

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172 from diarrhœal diseases, 146 from 'fever' (principally enteric), 131 from small-pox, and 91 from diphtheria. These 2,089 deaths were equal to 15 per cent. of the total deaths, and to an annual rate of 3·11 per 1,000. This zymotic rate showed a slight decline from the rate in the preceding month, but considerably exceeded that recorded in the corresponding period of last year. The death-rate in London from the principal zymotic diseases during May was equal to 3·55 per 1,000, and exceeded the average rate in the twenty-seven provincial towns, among which this zymotic rate ranged from 0·9 in Halifax, and 1·0 in Brighton and in Derby, to 4·8 in Liverpool, 4·9 in Portsmouth, and 5·6 in Oldham. Measles caused the high zymotic rates in Portsmouth and Oldham, and measles and whooping-cough in Liverpool.

Whooping-cough was the most fatal zymotic disease in the twenty-eight towns during May. The rate of mortality from this disease, which in the seven previous months had steadily increased from 0·26 to 1·10 per 1,000, declined to 0·96 during May, and considerably exceeded the rate in the corresponding period of last year, when it was 0·47 per 1,000. In London the death-rate from whooping-cough was as much as 1·27 per 1,000, and was nearly twice as fatal as in the provincial towns, among which it averaged 0·70 per 1,000, but was equal to 1·93 in Liverpool, and 2·27 in Bolton. The death-rate from measles, which had been 0·46, 0·79, and 0·96 per 1,000 in the three preceding months, was 0·94 during May. In London the rate of mortality from this disease was 1·05 per 1,000, and showed a further increase upon that recorded in recent months. In the provincial towns it averaged 0·85, but was equal to as much as 2·65 in Portsmouth, 2·83 in Wolverhampton, 2·94 in Plymouth, and 5·10 in Oldham. The death-rate from scarlet fever, which had steadily declined from 0·84 to 0·47 in the six previous months, further fell to 0·40 during May, and was lower than that recorded in any month since April 1883. In London the rate of mortality from scarlet fever was 0·35 per 1,000, while it averaged 0·44 in the provincial towns, and was equal to 1·16 in Leeds, and 1·39 in Sheffield. The rate of mortality from 'fever' (principally enteric or typhoid) was equal to 0·22 per 1,000, and showed a slight decline from the rate in the preceding month, and was considerably below that recorded in the corresponding month of either of the two previous years. In London the fever death-rate last month did not exceed 0·18 per 1,000; it averaged 0·22 in the provincial towns, among which it showed the largest excess in Portsmouth and Blackburn. The rate of mortality from diarrhœal diseases was below the average of corresponding months in recent years. The death-rate from diphtheria in the twenty-eight towns, which had been 0·14 and 0·15 in the two preceding months, was 0·14 during May; this disease was more than twice as fatal in London as in the provincial towns; it caused during last month 5 deaths in Portsmouth and in Nottingham, and 4 in Leeds and Cardiff. During the four weeks of May 131 fatal cases of small-pox were registered in the twenty-eight towns; showing a further increase upon the numbers in the three previous months. This increase was entirely confined to London, where 102 deaths occurred during the month. Of the 29 fatal cases in the provincial towns, which were fewer than in any of the six preceding months, 12 were recorded in Liverpool, 7 in Sheffield, 4 in Sunderland, 3 in Hull, 1 in Derby, 1 in Newcastle-upon-Tyne, and 1 in Cardiff. The prevalence of small-pox in London, judged by the returns of the Metropolitan Asylum Hospitals, showed a further very considerable increase. The number of small-pox patients under treatment in these hospitals, which in the three preceding months had increased from 41 to 502, further rose to 1,057 at the end of May, and exceeded the number at any period since July 1881. The average weekly number of new patients admitted to these hospitals, which in the two previous months had been 52 and 84, rose during May to 246.

The rate of infant mortality in the twenty-eight towns, measured by the proportion of deaths under one year of age to births registered, was equal to 135 per 1,000 during May, which was below the rates recorded in the corresponding months of recent years. The rate of infant mortality in London did not exceed 127 per 1,000, while it averaged 141 in the twenty-seven provincial towns, among which it ranged from 75 and 77 in Brighton and Birkenhead, to 170 in Halifax, 176 in Blackburn, and 187 in Preston.

The death-rate from diseases of the respiratory organs, judged by the metropolitan returns, was below the average during May. The weekly number of deaths referred to these diseases in London averaged 284, and the annual death-rate was equal to 3·7 per 1,000, against 3·3 and 4·2 in the corresponding periods of 1882 and 1883. The annual rate of mortality from these diseases in Liverpool last month was 5·0 per 1,000.

The causes of 328 of the 13,903 deaths registered in the twenty-eight towns during the four weeks of May were not certified, either by medical practitioners or by coroners. These uncertified deaths were equal to 2·4 per cent. of the total deaths, and showed a further slight decline from the proportions in the two previous months. The proportion of uncertified deaths did not exceed 1·1 per cent. in London, whereas it averaged 3·3 in the twenty-seven provincial towns, among which the proportions ranged from 0·0 and 0·4 in Norwich and Portsmouth, to 5·3 in Wolverhampton, and 6·5 in Oldham and in Halifax.

Among the population living in the outer ring of suburban districts around London, estimated at rather more than a million persons, the annual death-rate from all causes during May was equal to 15·9 per 1,000, against 16·0 and 17·2 in the corresponding periods of 1882 and 1883. During the four weeks ending the 31st ult., 60 deaths from whooping-cough, 40 from measles, 27 from diphtheria, 16 from scarlet fever, 15 from diarrhœal diseases, 13 from small-pox, and 9 from 'fever' were recorded in the outer ring. These 180 deaths from the principal zymotic diseases were equal to a rate of 2·2 per 1,000, which corresponded with the rates recorded in the preceding month. The fatality of whooping-cough showed a decline, while that of diphtheria considerably increased. Measles showed an excessive prevalence in Bexley sub-district, diphtheria in Harrow sub-district, and whooping-cough in West Ham sub-district. Of the 13 fatal cases of small-pox registered in the outer ring during the four weeks of May, 10 occurred in the district of West Ham, 2 in Edmonton, and 1 in Isleworth sub-districts.

THE main drainage works at Hendon have been commenced. They have been designed by Mr. Pollard, the engineer of the local board. Seven-eighths of the whole area of the parish is brought to the outfall by gravitation, and the other eighth has to be pumped. The surveyor's estimate of the cost of constructing the works was about 31,911*l.*, and the contract has been let to Messrs. Ford and Everett for 31,000*l.*

THE Corporation of Newcastle have selected the sites for the three sets of baths and wash-houses to be erected in different districts of the city. The stipulated expenditure on each of these buildings, including fittings, is not to exceed 7,000*l.* A large number of plans were sent in to the committee for competition, and on the recommendation of the President of the Institution of British Architects, Mr. W. H. Picton, of Liverpool, was chosen as adjudicator as to the respective merits of the plans sent in. That gentleman has awarded the premier place, for the best separate designs for the three sites, to Messrs. Gibson & Allan, architects, Newcastle, who will accordingly be entrusted with the carrying out of the whole of the work. The competitive designs were exhibited to the public for a few days in the Northumberland Hall, and excited considerable interest.

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SPECIAL REPORTS.

THE SOCIETY OF MEDICAL OFFICERS OF HEALTH.

At a meeting of this Society, held at 1 Adam Street, Adelphi, on Friday, May 16, the President, Dr. T. O. Dudfield, in the chair, Mr. H. Osborn, Medical Officer of Health for Southampton, was elected an extra metropolitan member of the Society.

The Council deferred making any report on the question whether places where fish, fruit, and meat pies are baked come within the scope of the Bakehouses Act, as the District Board of Bethnal Green were about to proceed against the occupiers of these places with a view to obtaining a legal decision.

Dr. James Stevenson then referred to the increased prevalence of small-pox in the metropolis, and stated that he had recommended that the public vaccinator should proceed to every house where small-pox occurred with a view to vaccinating and revaccinating the inmates.

Mr. Shirley Murphy stated that he had just recommended his vestry to adopt the same course. There was no legal provision for the vaccination of persons under these circumstances, except when the poor law medical officer was in attendance in his official capacity on a person suffering from small-pox in the house; he was then able to charge for such vaccination. It was, therefore, necessary for special arrangements to be made with the public vaccinator for the performance of this duty.

Dr. Hill pointed out that the advantages of such a system would be that the vaccination would be properly performed, and referred to the evidence that quality of vaccination had an important bearing upon the protection against small-pox.

Dr. Alfred Carpenter said that he had had personal experience of the power of vaccine to cause the small-pox virus to abort. Some twenty years ago, when he was chairman of the Sanitary Committee at Croydon, before the appointment of medical officers of health was compulsory, there was an epidemic of small-pox in the place; he visited every case, and on one occasion felt sick and faint in the patient's room. He immediately went home and revaccinated himself. The vesicle formed in due course, but on the eighth day he was surprised by a pain in the back, a distinct rigor, and general malaise; there was perspiration, but no eruption or other signs of the disease. On the tenth day he was perfectly well again. He considered at the time that the disease was effectually overtaken and extinguished by the revaccination, which was twenty years after a former operation.

Dr. Hill read a paper on 'The Sanitary Supervision of Bakehouses, with special reference to those of Birmingham.' It will be found on p. 580.

In the course of the discussion which followed Dr. Alfred Hill's paper, Dr. Dudfield referred to the advantages conferred by the last Act, but said there was still much need for the registration of bakehouses and for their regulation under by-laws. Those in Kensington were in good condition, but he attributed this to the fact that inspection had not been abandoned during the time bakehouses were under the control of the factories inspector.

Dr. Bate had included in his visits places where meat pies were prepared, and had found them in a very dirty condition; his authority had, on his advice, determined to prosecute the occupiers, and one case would be heard shortly.

Mr. Shirley Murphy was finding no difficulty in abolishing water-closets situated in bakehouses; he believed much good would come of the Act, but was of opinion that registration and regulation under by-laws would alone ensure bakehouses being kept as they should be.

Dr. Corner commented on the need for excluding employés while suffering from ill-health: he had not infrequently found them suffering from venereal disease while engaged at work. He asked if the health officers of Birmingham acted under any municipal law to compel notification of infectious diseases.

Dr. Simpson said that bakehouses in Aberdeen were in a very unsatisfactory condition, water-closets were often situated within them, and not being provided with a door, the bakehouse was practically converted into a water-closet. He doubted if the duty of inspecting bakehouses could be deputed by the medical officer of health to anyone else; he had failed to get meat-pie bakehouses recognised as bakehouses.

Mr. Lovett found employés in bakehouses to be clean in their habits; he had no difficulty with any but foreigners; Italians were especially filthy in their habits.

Dr. Alfred Carpenter thought there was need for notification of existence of infectious diseases in bakehouses as well as in milk shops.

Dr. Hill, in reply, stated that in Birmingham no distinction was made between meat-pie and bread bakehouses; there was no compulsory notification, but every medical man received five shillings for giving notice. The sick were removed to hospital or the shop closed; there was no power to close a shop, but this was accomplished by placing a man opposite the shop to tell every one about to enter that there was a case of infectious disease in it. Removal to hospital was usually consented to.

Dr. G. Paddock Bate read a paper on the 'Calculating Slide Rule as an Assistant to the Medical Officer of Health in Mensuration and Statistics,' which will be found at page 582.

ACADEMY OF MEDICINE IN IRELAND.

Sub-Section of Public Health.

The closing meeting of the session was held in the College of Physicians, the Registrar-General for Ireland (Dr. Grimshaw), President, in the chair.

Antiseptic Experiments in a Mortuary Vault.

Dr. Cameron read a paper on antiseptic experiments in the vaults of St. Michan's Church, Dublin, celebrated for their antiseptic properties. Bodies dry up in a desiccated mass rather than decompose when deposited in these vaults. The author placed an infusion of melon in Tyndall's tubes, and, having submitted both to a high and prolonged temperature so as to sterilise the liquid, he placed a number of them in a vault of the church, which seemed to possess the greatest antiseptic properties. The tubes were deposited with great caution, and in such a way as to occasion the least possible disturbance of the atmosphere. The extremities of the tubes were broken by means of hot forceps, and the vault was kept locked up for six weeks. They were then removed from the vault. Seven of the tubes presented no change, but in the remaining five there was great turbidity, owing to the development of mycelium, &c. In the case of the liquid kept in the unbroken tubes at the laboratory of the Royal College of Surgeons, no turbidity was noticed in their contents. On nipping the ends of the tubes of those kept in the laboratory and the sound ones brought from the mortuary vaults, turbidity set in under forty-eight hours. The author did not venture to draw any positive conclusion from these experiments, but their results seem to show that the preservation of the liquid was due to the great freedom from dust which he noticed in the vault. Tyndall had found that in the higher Alps organic infusions remained for a long time freely exposed to the air without undergoing decomposition, a fact attributed to the freedom of the air at great altitudes from dust, which of course included germs of various kinds.

Dr. Cosgrave believed the temperature of the vaults was very uniform, and there being no floating particles, that might prevent the vegetable infusion turning.

Dr. More Madden referred to the famous vaults near Palermo, where two miles of galleries were lined with the dead bodies of monks. The sides of the galleries and the dead bodies, which were in a state of desiccation, were coated with dust. Of the character of the dust he knew

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nothing, but the antiseptic properties of the galleries were ascribed to the peculiar dryness of the air and also to the nature of the soil in which the galleries were excavated.

Dr. Henry Kennedy asked whether any experiments had been made in places selected for their dryness to test the question of dryness as a factor. The temperature being exceedingly uniform was an obvious cause.

Dr. Woodhouse asked whether, as a matter of fact, the vaults of St. Michan's had a dry atmosphere? Unless the air there differed from that of other subterranean excavations with which he was acquainted in Dublin he doubted its dryness.

Dr. J. W. Moore inquired what was the chemical change; whether desiccation or saponification, such as took place in bodies preserved in bogs and other places?

The President said there was but one opening into the vaults—by a heavy iron trap-door. The stone in the vaults was not of a dry character, being calp limestone.

Dr. Cameron, in reply, said there was a good deal in what Dr. Cosgrave had suggested, that the effect was due chiefly, if not altogether, to the uniformity of the temperature, which hardly varied. If there was no expansion by an increase of temperature, or no contraction by a fall of temperature, a liquid would be the same as when sealed. At night the temperature must have fallen a little, and some little movement of air have taken place. But, even taking that view, it was the absence of dust that caused the preservation of the contents of the tube. Seven tubes remained perfectly clear, and five became turbid. The air and dust must have got into the latter. As a matter of fact, the vaults were dry. When vaults were not dry, moulds made their appearance, as at present in the vaults of the new markets. He had often heard the antiseptic properties ascribed to a peaty bottom. No doubt in Christ Church Place and High Street, at the opposite side of the river, the houses were built on piles, owing to the existence of peat bogs. But that was not the case with Church Street, where there was 30 feet deep of limestone gravel. The dryness and absence of dust were factors in the preservation of the bodies. In the vaults of St. Michan's, which were 10 feet below the surface, he could see the sunbeam enter a little, but there did not seem to be anything like the usual amount of dancing particles in it. He was struck by the almost total absence of dust, none resting on the coffins.

The President hoped Dr. Cameron would continue his experiments.

DRAIN VENTILATION.

Mr. A. E. Hubert, sanitary engineer, lately delivered a free lecture on this subject to a large audience at the Town Hall, Cardiff. Dr. Wallace, who presided, in introducing Mr. Hubert, said that only that day he had discovered in he house of a patient of his the lavatory and the urinal attached to the billiard-room, communicating direct with the drains. He thought the Corporation had a by-law to the effect that the waste from places of that kind should be ventilated outside the house. Only a month ago he attended the wife of a well-known Corporation official, whose serious illness, in his opinion, was caused by defective drainage and bad workmanship in a building recently erected at the expense and under the supervision of the Corporation. Mr. Hubert then commenced his lecture, which consisted for the most part of a description of the Banner system of drain ventilation, which he said had created a new era in sanitary science. By this system, which could be easily applied to any house, all the drains and soil-pipes—instead of always being full of sewer gases—were kept clear. The house drains were, in the first place, securely trapped against the sewers and cesspools; and then a current of air was made to pass through them, which prevented the formation of sewer gas. The air was admitted on a low level, and drawn through the pipes by the action of an exhaust ventilator fixed on the top of a pipe above the chimney; or the system might be reversed, and the higher point made the inlet and the other one the outlet. Mr. Hubert stated that the water-traps which were so extensively used afforded alone no protection whatever against sewer gas; and he strongly condemned all the various forms, especially the 'Bell' trap and 'D' trap. The system was fully illustrated by diagrams and models, and Mr. Hubert also showed various forms of water-closets, and explained their construction and working. He declined to say which was the best form; but said the great essential with all of them was a good volume of water, discharged with sufficient force and suddenness to thoroughly cleanse them. Answering a number of questions, the lecturer said he quite agreed with Dr. Paine in recommending that the main sewers of the town should not be ventilated by gratings in the street, but by pipes carried above the roofs of the houses. At the conclusion a vote of thanks was heartily accorded to Mr. Hubert.

THE HEALTH OF IRELAND.

The quarterly return of marriages, births, and deaths in Ireland, which has just been issued, shows the facts relating to marriages for the fourth quarter of 1883, and those relating to births and deaths for the first or winter quarter of this year. The marriage-rate exceeded the average for the corresponding quarter of the three preceding years, while the birth and death-rates were below their respective averages for the same quarter of recent years. The returns of pauperism for the quarter, compared with those in the corresponding period of last year, show a decrease both in the number of indoor and of outdoor paupers, though the number of persons in receipt of outdoor relief considerably exceeded the average.

The births registered during the three months ending March 31 last were 29,964, which were equal to an annual rate of 24·2 per 1,000 of the population, estimated at 4,952,895; this rate was 1·7 below the average rate in the corresponding period of the five years 1879-83, and 1·2 below the rate in the first quarter of 1883. In the four provinces of Ireland the birth-rates were 22·6 in Connaught, 22·9 in Ulster, 22·9 in Munster, and 24·1 in Leinster.

During the first quarter of this year the deaths registered in Ireland were 24,149, equal to an annual rate of 19·5 per 1,000 of the estimated population, which was as much as 3·2 below the average rate in the corresponding quarter of the five years 1879–83, and lower than that recorded in the first three months of any year since 1874. This very low death-rate was principally due to the exceptional mildness of the season, the meteorological conditions of which were particularly favourable to the public health. In Leinster the death-rate last quarter was 21·6 per 1,000, in Munster 18·3, in Ulster 18·6, and in Connaught 15·0.

The 24,149 deaths registered in Ireland during the quarter under notice included 1,860 which were referred to the principal zymotic diseases, of which 507 resulted from whooping-cough, 434 from 'fever' (principally enteric), 320 from diarrhœal diseases, 313 from scarlet fever, 201 from measles, 83 from diphtheria, and not one from small-pox. These 1,860 deaths were equal to an annual rate of 1·5 per 1,000, which was 0·5 per 1,000 below the rate from these diseases in England and Wales during the same period. In the aggregate the death-rate from the principal zymotic diseases in Ireland last quarter was below that recorded in the corresponding quarter of 1883, and compares favourably with that returned in any recent quarter; although whooping-cough showed increased prevalence, and was more fatal than in any quarter since 1880. The mortality from scarlet fever showed a marked decline, and was lower than in any quarter since the third of 1882. The deaths from measles, however, which had been 126 and 142 in the last two quarters of 1883, further increased to 201; this disease was most prevalent in Connaught.

The return, as usual, contains an important table relating

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to the mortality in urban and rural sanitary districts. In the forty-eight urban sanitary districts (including Dublin), comprising a population of rather more than a million persons, the death-rate from all causes during last quarter was 25·7, and the zymotic rate 2·6 per 1,000; in the rural sanitary districts, comprising a population somewhat exceeding four millions, the death-rate did not exceed 16·9 per 1,000, and the zymotic rate was only 1·1. In Dublin, consisting of nine urban districts, and having an estimated population of 351,014 persons, the death-rate from all causes was 26·9, and the zymotic rate 2·2 per 1,000. In London these rates were last quarter 20·4 and 2·7, and in Edinburgh 20·5 and 3·6 per 1,000 respectively.

The number of emigrants who left Irish seaports during the first quarter of 1884 was 9,255, being 4,144 less than the number in the corresponding period of 1883, and 803 below the average for the first quarter of the ten years 1874-83. According to the Board of Trade Returns, the number of emigrants of Irish origin who left the various ports of the United Kingdom where emigration officers are stationed, which had been 11,159 and 9,510 in the first quarter of 1882 and 1883, further declined to 7,792 in the three months ending March 31 last.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS.

THE first annual dinner of this association took place at the Holborn Restaurant on Saturday, June 7, Mr. Edwin Chadwick, C.B., the president of the association, in the chair. Amongst the visitors were Lord Fortescue, Sir Richard Owen, K.C.B., Baron Liebhaber, Dr. Alfred Carpenter, Dr. B. W. Richardson, F.R.S., and Captain Douglas Galton, C.B. The dinner was very numerously attended by the members and friends of the association, upwards of one hundred gentlemen being present. In proposing the toasts of the Queen and the other members of the Royal Family, the chairman laid special stress upon the attention which both her Majesty and the Prince of Wales had bestowed upon sanitary matters in connection with their respective estates at Osborne and Sandringham, observing that the Prince had been at great pains to obtain a pure and soft supply of water at Sandringham, which was now of the highest purity as a beverage, and saved the cottagers' tea and soap. This supply of soft water, Mr. Chadwick stated, was what the whole supply of London might be, under unity, and might be delivered at the rate of three-fourths of a farthing per head for 32 gallons per diem.

In proposing the health of the Army and Navy, the chairman took occasion to note what sanitation had done for the Army, pointing out that, by the action of the Army Sanitary Commission, the death-rate had been reduced from 18 to 8 per 1,000, and that, by the diminution, upwards of 4,000 beds were saved, which, under the old military and curative service, would have been required to be occupied. In India alone, recent accounts showed that, during the last decade, there had been a saving of 40,000 of force in sickness and deaths, and of more than five millions in money. Germany had made even greater strides in sanitary science, and had reduced the death-rate of her army to 5 in 1,000, against 10 in 1,000 in the French army. The Navy, the chairman remarked, was, with its death-rate of 4½ in 1,000, in advance of the Army with more yet to do, and he saw no reason why this rate should not be brought up to that of a prison, namely, to 3 in 1,000 from spontaneous disease.

Captain Douglas Galton, C.B., responded, and fully endorsed all that the chairman had said with reference to the Army.

The toast of the evening—'The Association'—was proposed by Dr. Richardson, who said that necessity had brought the association into existence, and that he regarded the movement as one of the most important that had ever taken place in the progress of sanitary science, concluding his speech by passing a high eulogium upon the services rendered to the cause of sanitation by Mr. Chadwick.

Mr. Chadwick, in reply, stated that one of the first steps to be taken to retrieve the neglect of past years was to remove, as far as possible, the widely prevalent ignorance as to the cost of preventable disease. Taking the metropolis as an instance, he confidently estimated, from what had been done by sanitation in urban districts elsewhere, and from what had been done in sub-districts within itself, that a deduction might be made in the present death-rate of 5 per 1,000. This would effect a saving for the 4,000,000 of the inner ring of the population, of 20,000 lives annually, and a saving in money for excessive funerals, and for labour lost to the adults by excessive sickness, of 700,000*l.* per annum. This sum, capitalised at thirty years' purchase would give 21,000,000*l.* sterling, or 50*l.* per house, enough under a competent administration to pay for the chief primary works required for prevention. All over the United Kingdom the losses from preventable disease were not less than 25,000,000*l.* per annum, or three times the amount of the poor-rates. During the last decade the Registrar-General showed that there had been an important reduction of the death-rate, and a saving of nearly 400,000 lives, which must have been attended by a saving of upwards of 4,000,000*l.* in England and Wales. This saving must have been due, in a great measure, to the services of the 1,700 inspectors, imperfect as their services were. With more full attributions a larger economy might be anticipated. In sanitation they needed no pity, no benevolence. The sanitary inspector was the executive hand of the devising head, the health officer of the sanitary engineer himself. He had to test the drainage and ventilation of houses, and to see to the proper action of sanitary appliances, and for such services good judgment and much skill was required. In sanitation, in unpaid, as well as in paid, service, nothing was so wasteful as ignorance and incompetency. It was due to the Sanitary Service that it should be placed in the position, now accorded to the majority of the officers under the Local Government Board, of permanence in office during good behaviour, and of security against the adverse interests to which they must be, at times, more exposed than other officers. In the performance of their duties they often had to see and deal with evils individually, and he considered it important and fair that they should make their individual reports for the information of the local authorities under whom they served, and for the public.

Amongt the other toasts were 'The Visitors,' proposed by Mr. W. Rains, and responded to by Sir Richard Owen, Dr. Carpenter, and Lord Fortescue; and 'The Executive,' proposed by Mr. E. C. Robins, F.S.A., and replied to by Mr. G. B. Jerram and the honorary secretary, Mr. S. C. Legg, who is to be congratulated upon organising so unusually successful a gathering.

BEDRIDDEN FOR NEARLY HALF A CENTURY.—A few days ago, Ellen Rogers, aged 76, who had been bedridden for nearly fifty years, died in Southall's Buildings, Willow Street. About the time above-mentioned the deceased took to her bed on feeling unwell. She was kindly treated by the benevolent, and when convalescent had no desire to get up, and there she remained until at last she was unable to do so. The bed is said to have rotted away, sinking down to the floor with her. She had received parish pay for many years, which was conveyed to her by a neighbour. The stench of the place was unbearable, and on the removal of the body, mice and other vermin, that had taken refuge under where the deceased lay, were creeping about. The questions naturally arise how was it that the local authorities remained passive all that time, for the poor creature must have been of feeble mind, and as such, should have been removed and kindly tended; what were the neighbours about to allow such a state of things in their very midst; and where was the sanitary inspector?

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ILLUSTRATED SANITARY PATENTS.

ENGLISH.

521. (1884.) IMPROVEMENTS IN WATER-CLOSETS: W. H. BERWICK, Newcastle-upon-Tyne. [4*d.*]—The

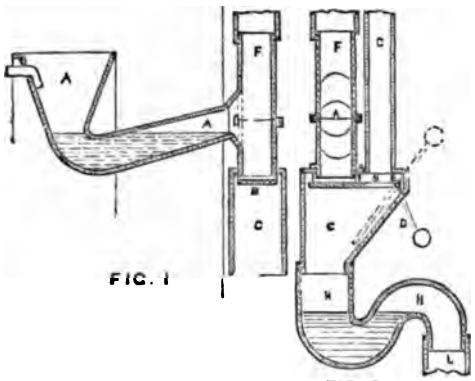

FIG. 1

FIG 2

water-closet is constructed contiguous to the external wall of the house, of glazed earthenware with flushing arrangements by water as usual. The water so admitted moves a flap valve outside the house afterwards described. The pan is fixed in position and the pipe leading from it to the waste being preferably made in one piece with the pan, is inclined upwards so as that it forms a trap between the pan and the outer end of the pipe sealed by contained water. Outside the house the end of this waste pipe is sealed to a tube projecting downwards in a box; at the bottom of the tube there is a flat plate of earthenware or glass and an India-rubber washer at the junction of the tube and plate. This plate is ordinarily kept in contact with the pipe end or the India-rubber washer by a balance weight or spring, the weight or force of which is such as to be overcome by a flush of water. The plate is hung on an arm or arms, and is capable of being moved on a pivot, or pair of pivots, so as to open or close the orifice of the pipe. The pipe so closed is prolonged upwards so as to form an air-pipe above the level of the roof of the house; but, in addition, a second air-pipe is provided for sewer gas parallel to that last described, and also reaching to above the roof of the house, and which pipe is always open. Below is provided a pipe trapped with an S trap at any convenient part of the pipe leading to the drain. Fig. 1 is a vertical section of the whole arrangement. Fig. 2 is a section on the line, *a b*. A A represents the pan and its pipe, B; the flap in two views, C, the box in which the flap works, D, the arm of the flap, and E the pivots on which it moves, F, the air-pipe from the closet-pipe, and G, the air-pipe for sewer gas, H, the trap on the drain-pipes, and J, the waste pipe itself. The level of the water in the traps is indicated by shaded lines.

3,480. (1883.) APPARATUS FOR THE RECEPTION AND REMOVAL OF HOUSE AND STREET REFUSE: W. K.

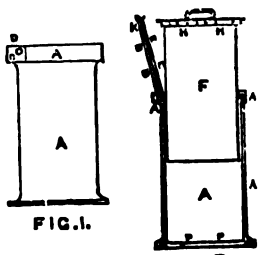

FIG. 1.

FIG. 2.

SEDGWICK, Surbiton, Surrey. [6*d.*]—The invention consists of two boxes one within the other, the outer box having a hinged lid attached thereto, the inner box is contained entirely within the outer box, and can readily be removed therefrom and replaced. The inner box is exactly square on plan, and fits the outer box side for side in every way, thereby removing any possibility which might otherwise arise of the same being temporarily jammed or fixed within the outer box by careless replacement; the whole can be made of any suitable material, and of any dimensions which may be necessary to meet the requirements of any premises to which the orderly bin may be specially applied. The outer box is hereinafter termed the shell, and the inner box the bin. Fig. 1 shows the apparatus complete, with the bin inside; and fig. 2 shows a section with the lid open and the bin half taken out. The shell A is intended to be fixed in the public footpaths, pavements, or approaches to any buildings of any description for which the orderly bin may be required within the inner line of kerb: thus affording it effectual protection against the impact of vehicles, and sunk in the ground with the top surface of the lid, which is checkered flush with the pavement and kerb.

3,512. (1883.) WATER-CLOSETS: E. & A. E. GILBERT, DUNDEE, N.B. [6*d.*]—This invention, which relates to improvements connected with water-closets, has reference to a mode of constructing the seats thereof, so as to promote cleanliness and comfort and to avoid the necessity of bringing the person into contact with the usual wood framework, and as a consequence to avoid the risk of contagion which is daily encountered in hotels, railway stations, and other public places. In carrying out the invention, the basin (with the necessary flushing

apparatus) is sunk into the floor so that its top edge may be on a level with the floor or platform, or the basin may project above such floor or platform as may be desired. In front of the basin, and at an angle in a forward direction, is placed a shield or open funnel for the reception of water and for its conveyance into the basin. From the wall at the back of the basin, or from a framework constructed for the purpose, is suspended by a hinge a pair of arms in the shape of horns or of a horseshoe, which can either be used as a seat or can be lifted back against the wall, leaving the visitor to the closet perfectly free and independent of all risk of contagion from a previous visitor. The hornlike seat is made of wood, and fixed to a metal frame, which is hinged or pivoted to the fixed framework or wall.

3,740. (1883.) APPARATUS CONNECTED WITH WATER-CLOSETS: T. W. HELLIWELL, BRIGHOUSE, YORKSHIRE. Fig. 1 is a longitudinal section of certain parts of the apparatus, and fig. 2 is another section. A is a pipe, the upper end of which is connected to a water-closet basin, whilst its lower end is connected to or in communication with a box or chamber, B, cast with or otherwise connected to the main discharge-pipe C, which is in communication with the drain or sewer. It will be observed that the orifice of the pipe A entering the chamber B, is provided with a hinged flap or trap, D, and that the opening from the chamber, B, to the main discharge pipe, C, is also provided with a hinged flap or trap, E, both of which traps are so hinged that when the water-closet basin is flushed the pressure thereof will cause

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the said traps to yield upon their hinges and open, allowing the matter to escape freely, but as soon as the flushing has ceased the traps are heavy enough to close again, suitable packing being placed at the closing parts of the

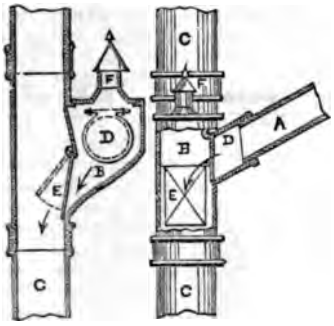


FIG.1 FIG.2

traps so as to make them as far as possible air-tight. It will therefore be seen that when noxious gases pass from a drain or sewer up the pipe, C, that they cannot easily enter into the pipe, A, to the closet basin, as the hinged trap, E, will be closed, but in the actual working of such things it is found that gases do escape through the sides of hinged traps. A chamber, B, is therefore formed, and another trap, D, but in addition to these traps a ventilator, F, is placed at a point or position between the two traps; so that when gases pass through the sides of the trap, E, they enter the chamber, and pass out through the ventilator, F, into the atmosphere, making it impossible for gases to pass the second trap, D, to the pipe, A, and forward to the basin.

3,760. (1883.) AUTOMATIC FLUSHING AND ANTISEPTIC TANK: F. I. AUSTIN, SANITARY ENGINEER, LONDON. [6*d.*]—This apparatus consists of an ordinary

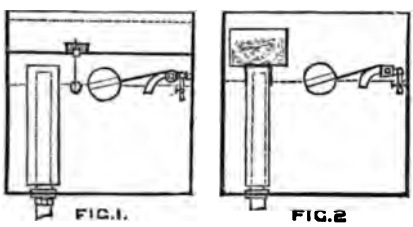
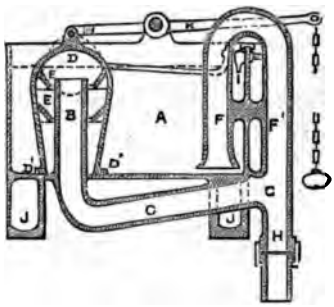


FIG.1. FIG.2

cistern, in or near the centre and running up through the bottom of which is an outflow pipe for discharging the cistern. Over the outflow pipe and extending from about an inch or half an inch from the bottom of the cistern is another pipe closed at the top and covering the other like a cap or inverted tumbler, leaving a clear space round the exterior of the inner pipe and over the top of it about an inch or thereabouts according to the dimensions of the tank or cistern to be discharged. The water supply comes from the main or other service in the usual way by means of a ball valve and regulating tap which work as follows:—The tap can be so regulated as to fill the cistern to a certain given line or height therein up to and on a level with the mouth of the outflow pipe at regular periods of time, say, three, six, or twelve times a day, or more frequently if required. When the water in the tank reaches the given line, the ball cock is thereby raised which further opens the valve and allows the water to rush into the cistern very rapidly until it rises over the cap aforesaid, whereupon the effect of a syphon is caused, and the contents of the cistern are at once rapidly discharged down the outflow pipe. He also fixes over or within the aforesaid cistern, a tank containing disinfecting fluid with a ball valve at the bottom of it, so that by means of this ball tap operating within the larger water cistern or tank, the valve is automatically opened simultaneously with the rapid discharge of the water into the cistern as before mentioned, and the contents thereof coloured or deodorised.

3913. (1884.) IMPROVED DOUBLE SYPHON FOR FLUSHING WATER-CLOSETS, DRAINS, AND SEWERS: W. DEVOLL, Engineer, Erdington, Birmingham. [4*d.*]—



The action is as follows. The cistern having been filled by the ball valve, the water now rises in the air-vessel until it reaches the edges of the blades or discs, E E, and confines the air underneath them, thus forming additional air-vessels round the interior of the air-vessel, D. The air thus compressed underneath the blades by the pressure of the water in the cistern keeps back the bulk of the water tending to rise in the air-vessel. By making the air-vessel, D, of the shape shown on the drawing, a greater area is obtained in the crown or upper part than at the mouth, and the quantity of air compressed in the crown prevents any water that has passed through the holes in the centre of the blades from rising to the top of the pipe, B, as long as the vessel remains at rest. The cistern being now full, if the lever, K, be pulled down by means of the chain, the air-vessel will be raised a short distance, and the air within being thus removed farther from the water, allows the water to rise to and run down the pipe, B. The air having now been withdrawn from the air-vessels by means of the water rushing down the pipe, B, a syphon action is thereby formed by the pipe, B, and the air-vessel. The water from this syphon falls into and passes through the pipe, C, until it reaches the junction, G, when it rushes down the fall-pipe, H, and this water by its descent draws off the air in the other syphon-pipe, F, and immediately sets it in motion. Both the syphons now continue to draw together from the cistern and pass their water into the one fall-pipe, H, until the cistern is empty, thereby giving a greater and more rapid flush than can be obtained from a single syphon. After the two syphons have ceased running, water will still remain in the elbow of the pipe, C, the fall or dip of which is equal to the diameter of the pipe, so as to form a trap, or pipe full of water, for the purpose of instantly charging the other syphon, F, in the manner above described.

4305. (1883.) IMPROVEMENTS IN A WATER-CLOSET: A. EMANUEL, SANITARY ENGINEER, LONDON. [4*d.*]

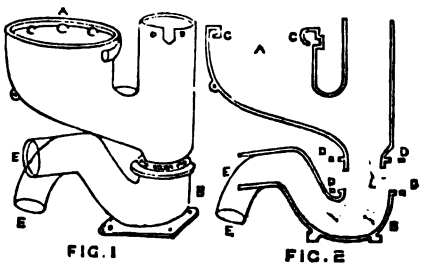


FIG.1 FIG.2

This invention consists of improvements in a water-closet, s described in the drawing annexed. In the first place or the addition of a flushing rim marked C, and secondly

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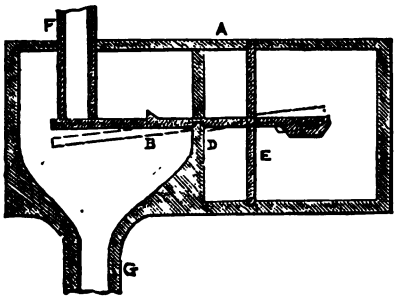
for connecting the trap to basin of closet. The trap, B, is so arranged that it can be turned round to different angles, so as to be adjustable to the soil-pipe. The basin is connected with trap by flanges and bolts fitted in slotted holes marked D. A is the closet basin, B is the trap, C is the flushing rim, D are the slots, E is the outlet of trap.

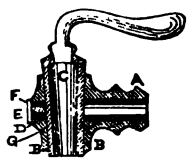
AMERICAN.

287,413. SEWER-TRAP. JACOB BODINE, Jersey City, N. J. Filed March 8, 1883.—*Claim.*—1. The combination of the shell, the inlet thereto, a partition, an automatic



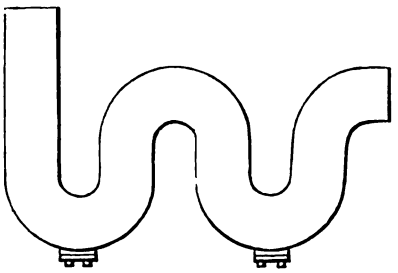
valve loosely supported in said partition and normally closing the inlet, and a guide for said valve, substantially as shown and described. 2. The combination of the shell A, inlet F, outlet G, and an automatic valve supported loosely in said shell and provided with a dam, substantially as shown and described. 3. The combination of the shell A, inlet F, outlet G, partition D, automatic valve B, guide E.

287,427. SPIGOT. GEORGE W. EVANS, Baltimore, Md. Filed Feb. 9, 1883.—*Claim.*—1. In a spigot of the



described class, the combination of the spigot-tube A, having tapering barrel B, provided with female threaded tubular neck D, with the turn-plug C, the screw-threaded plug E, having milled head F, and the button G, having cylindrical concave inner end.

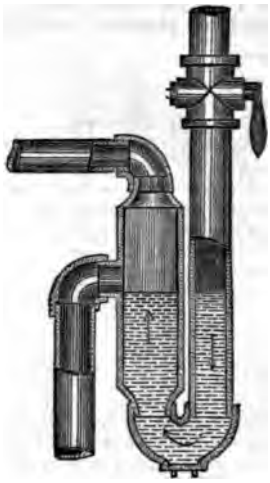
287,510. PLUMBER'S TRAP. FREDK. N. DU BOIS, New York, N.Y. Filed April 6, 1882. *Claim.* — A



plumber's trap of seamless soft metal constructed with a series of seals or dips, substantially as set forth.

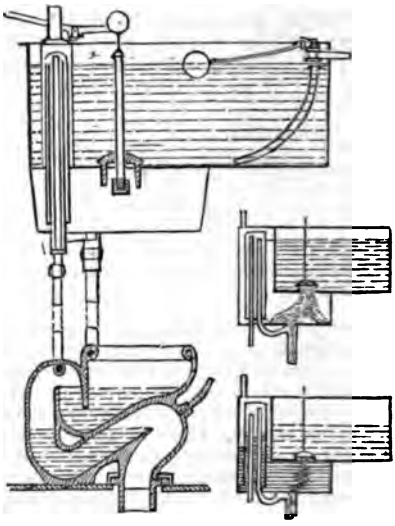
290,608. SEWER-TRAP. LOUIS A. PELLIER, San José, Cal. Filed June 30, 1883.

Claim.—1. The combination of the upright T-branch, the outlet and ventilating pipes, the U-bend, and the upright pipe constituting the inlet-leg of the syphon, substantially as described. 2. The combination, with the sewer-trap and the sole inlet-pipe thereof, of a stop-c adapted to be turned by hand in the said sole inlet, so



to cut off at will all connection with the trap, substanti as described. 3. The combination of the ventilati syphon-trap and the sole inlet thereof with a stop-c adapted to be turned by hand in said sole inlet, s stantially as described.

291,189. FLUSHING APPARATUS FOR WATER-CLOSE JAS. E. BOYLE, Brooklyn, N.Y. Filed March 12, 18 This is a flushing apparatus for water-closets, consisting



a reservoir-tank, a flushing-chamber adapted to be fill therefrom, a valve controlling the admission of water fr said tank to said chamber, a suction-injector arrang beneath the outlet from said chamber, a flushing-p leading from said injector, and a suction or air-pipe co municating with said injector, all combined and arrang substantially as set forth, whereby the water in escap from said chamber into the flushing-pipe traverses s injector, and sucks the air from said suction-pipe. T combination of a reservoir-tank, a flushing-chamber, valve controlling the admission of water from said tank said chamber, a suction-pipe terminating at the upper p of said chamber, an injector beneath the outlet from s chamber, a flushing-pipe leading downward from said jector, and a suction-passage affording communication

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said injector to said suction-pipe, substantially as and for the purposes set forth. A flushing apparatus for water-closets, consisting of a reservoir-tank, a flushing-chamber, a valve controlling the admission of water from said tank to said chamber, a suction-injector beneath the outlet from said chamber, a flushing-pipe leading downward from said injector, a suction or air-pipe opening into the upper part of said chamber, and a suction-passage extending from said pipe to said injector, whereby the passage of water through said injector into the flushing-pipe will develop a suction in said suction-passage and suction-pipe, in combination with means, substantially as described, for admitting air to said suction-passage or pipe, and so breaking the vacuum therein before all the water has escaped from the chamber, whereby an afterwash is secured, all combined and arranged to operate substantially as set forth.

THE Prudhoe district of the Hexham Union Rural Sanitary Authority has recently suffered much from want of water; the medical officer reported at the last meeting of that authority that cases of enteric and typhoid fever had occurred at Elthingham, the cause of which was evidently due to want of water. An application had been made to the Newcastle and Gateshead Water Company to supply the Mikley and Hullyards district with water, but the company had declined to incur the necessary expense. After some discussion it was resolved to send the correspondence with the water company to the Local Government Board, and also to suggest that Prudhoe be formed into a district local board district. The chairman considered that the requirements of that district were sufficient to occupy the whole time of a sanitary inspector.

HERBERT SPENCER ON BUILDING LAWS.—This philosopher writes as follows in the *American Popular Science Monthly* for May:—From these law-produced mischiefs, which were great a generation ago, and have since been increasing, let us pass to more recent law-produced mischiefs. The misery, the disease, the mortality in 'rookeries,' made continually worse by artificial impediments to the increase of fourth-rate houses, and by the necessitated greater crowding of those which existed, having become a scandal, Government was invoked to remove the evil. It responded by Artisans' Dwellings Acts; giving to local authorities powers to pull down bad houses and provide for the building of good ones. What have been the results? A summary of the operations of the Metropolitan Board of Works, dated December 21, 1883, shows that up to last September it had, at a cost of a million and a quarter to ratepayers, unhoused 21,000 persons and provided houses for 12,000—the remaining 9,000 to be hereafter provided for, being, meanwhile, left houseless. This is not all. Another local lieutenant of the Government, the Corporation of London, working on the same lines, has cleared four spaces, amounting to several acres; but has unhappily failed to get them covered with the substituted houses needed, and has thus added a farther thousand or two of those who have to seek homes in miserable places that are already overflowing! See, then, what legislation has done. By ill-imposed taxation, raising the prices of bricks and timber, it added to the cost of houses, and prompted, for economy's sake, the use of bad materials in scanty quantities. To check the consequent production of wretched dwellings it established regulations which, in mediæval fashion dictated the quality of the commodity produced; there being no perception that, by insisting on a higher quality and therefore higher price, it would limit the demand and eventually diminish the supply. By additional local burdens, legislation has of late still further hindered the building of small houses. Finally, having, by successive measures, produced first bad houses and then a deficiency of better ones, it has at length provided for the increasing overflow of poor people by diminishing the house capacity which already could not contain them. Where, then, lies the blame for the crying evils of the East End? Against whom should be raised 'the bitter cry of outcast London?'

LAW REPORTS.

(*Before* MR. JUSTICE WATKIN WILLIAMS.)

The Lea Conservancy Board v. *the Mayor and Corporation of Hertford and the Rivers Purification Association.*

JUDGMENT was given in this case, which involved some important questions as to the way of disposing of sewage, &c. The broad question appeared to be whether, if an Act of Parliament gives a power of disposing of sewage treated in a certain way and upon certain conditions, which are observed and complied with as far as practicable, an action is maintainable for pollution of a stream by the sewage thus treated. The action was by the Conservators of the River Lea against the Corporation of Hertford and the Rivers Purification Association, to which they had delegated their powers as to the disposal of the sewage. At Ware the River Lea is divided into two branches, one of which passes through a small tributary—the 'Manifold Ditch'—broad and sluggish, which flows into the river and receives the natural drainage between the two towns of Hertford and Ware, the two branches reuniting not far above Ware, and the junction being about one mile and a quarter from Hertford. Between the towns, a quarter of a mile from the east end of Hertford, are the 'intake' works of the New River Company, which supply a large portion of the metropolis with water. The town of Hertford is a small but very ancient town, with a population of 7,000. Its sewage is very much diluted by subsoil drainage, by springs of water, and by floods of rain water, and it seems that there, as in other places, it used to flow into the river. Down to 1854, at all events, the town was without any regular system of sewage, and the sewage was allowed, through ditches, to get into the river. For many years—far beyond living memory—a large quantity of sewage drained into the river at the north end of the town, above the 'intake' works of the New River Company, and some part of it found its way to the ditches to the east. In 1854 there was an Act of Parliament passed reciting that it was expedient that the company should be enabled to provide more effectually against the deterioration of the water of the New River Company by the construction of intercepting sewers near Hertford; and the company were authorised to construct a system of drainage and sewers, uniting in a main sewer to the east of the town, and to construct works for the conveyance of the sewage water along a specified course, terminating in the 'Manifold Ditch,' not far from its entrance into the Lea. The Act authorised the residents in Hertford to drain their houses into the sewers, and empowered the company to intercept the sewage and carry it into the main sewer. The Act also provided, however, that the company should not discharge any of the sewage into the Lea until it was subjected to the then best process of purification (Higg's) or the best known and practicable process. Under this Act the New River Company executed the sewerage works authorised, and subjected the sewage to the then best process of purification, and constructed from these works an open cut or channel, three-quarters of a mile long, passing through the meadows into the ditch referred to as passing into the Lea, Higg's process, the best then known, being adopted for the treatment of the sewage before it went into this cut or channel; and so things went on for some years. In 1860 another Act passed for the better preservation and the purity of the water, and for that purpose creating the 'Lea Conservancy Board,' to which all powers existing were transferred. The Act prohibited the passage of any sewage into the river, except by channels already used for that purpose. By this Act it was also provided that the existing drainage and sewage works, subject to the new Act and all powers and duties, should be transferred to the Corporation of Hertford, who from that time were to discharge and exercise these powers and duties, but that they should not do anything which might cause the flow of any sewage water from Hertford into the ditch or into the New River. 'Higg's process'

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was found unsatisfactory, and about 1870 another and better process was discovered, which the Corporation then adopted, and at an expense of 3,000*l.* constructed new and improved works for the purification of the sewage. In 1876 they took it into their own hands, and in 1878 placed it in the hands of the Rivers Purification Company (their co-defendants in this action), who had adopted another and improved process of purification to which the sewage was subjected before it was allowed to flow into the new cut. Still the process failed to give entire satisfaction, and complaints were made as to the foul condition of the ditch, and the great accumulation of mud in the stagnant parts of the Lea, and from these complaints resulted the present action.

The learned Judge gave his judgment to the effect that the plaintiffs had not established any of their causes of complaint, the Corporation of Hertford having to the best of their ability carried out their statutory powers, fulfilling the statutory conditions, and discharging their statutory duties. It had been contended on the part of the plaintiffs that the defendants had caused damage to them by permitting sewage water, foul and injurious, to flow into the ditch and the river, and that, though the defendants may have used the best known practicable process of purification, yet if injurious consequences resulted, they were liable to action, and were not justified by the powers conferred upon them by their Acts; and that, even if this were not so, they had failed or neglected properly and effectively to apply the process they were using, even assuming it to be the best, and that by this neglect they had allowed the unpurified or imperfectly purified sewage to flow into and pollute the stream. On the other side, on the part of the Corporation, it was contended that they had only carried out the powers of their Acts, and were not liable for so doing, even though some impurities might get into the river, and that no real damage or injury had been caused by the flow of the sewage water, which had been fairly purified, and was substantially freed from deleterious matter. The learned Judge then proceeded to give the grounds and reasons for the conclusion he had come to—that the defence had been established, and the plaintiffs' case not made out. The rights and duties of the Board and of the Corporation were, he said, governed by statute. The company at first and now the Corporation were authorised, after treating the sewage in a certain way (the 'best known practicable'), to carry it in a certain specified course, and they had done so. The intention of the Legislature, in his opinion, was to confer upon them that authority, subject only to those conditions, and those conditions they had observed and fulfilled; and, subject to those conditions, they had authority to convey the sewage water thus treated into the river. So long as they treated the sewage in the 'best known practicable way' they were justified in so disposing of it, and no action would lie against them for so doing. The true view was that the Legislature had considered that the sewage so treated and conveyed away by a rapid channel in the open air would be sufficiently free from impurities to be fit for drinking water. And that view, he considered, was substantially sustained in this case in point of fact. Coming, then, to the question of fact raised in the case, and which had been vigorously contested in evidence, especially of scientific witnesses, the learned judge said he had twice visited the scene, and had come to the conclusion that no part of the impurities complained of were derived from any solid parts of sewage being allowed to pass through the works at Hertford. There was a vast accumulation of mud, extremely offensive, but he thought the evidence as to its character had been grossly exaggerated. Witnesses had been misled by a hasty and superficial view to the conclusion that it must have arisen from the sewage, whereas he believed that it had arisen from a long-neglected accumulation of bad river-mud in a stagnant corner of the river, where it was allowed to decompose and become offensive. So he came to the conclusion that there had been no material pollution of the waters of the Lea from this cause. The case for the plaintiffs, therefore, had failed under the statutes; the defendants having only exercised their statutory powers and fulfilled their statutory obligations. It was contended that there had been a common law nuisance; but after carefully considering the evidence, including the evidence of eminent chemists as Dr. Odling, Dr. Tidy, Mr. Wanklyn, and others, he came to the conclusion that there had been great exaggeration as to the condition and appearance of the water, and that there was nothing approaching to a nuisance at common law. On the whole, therefore, he came to this conclusion:—(1) that so long as the Corporation really and efficiently subjected their sewage to the best-known practicable process of purification they were not liable to action for discharging it into the river at the specified spot; (2) that the Corporation had so treated the sewage and had so disposed of it; (3) that the accumulation of mud in the river was not caused by their sewage; (4) that no real injury or nuisance had been caused by the Corporation to the water of the Lea. On these grounds he gave judgment for the Corporation, dismissing the action with costs.

(*Before* MR. JUSTICE KAY.)

Lusher v. *Gibbs.*

CARPET-BEATING A NUISANCE.

The plaintiff in this action was the occupier of a house in the Upper Richmond Road, Putney, and the defendant was a builder, who was in the occupation of a paddock and premises adjoining the plaintiff's house and garden. The defendant had been in the habit of beating carpets on a portion of his premises which was at a considerable distance from the plaintiff's house, and no annoyance has been thereby caused to the plaintiff. Recently, however, the defendant had commenced the beating of carpets at a spot only 9 feet from the plaintiff's garden, and there was evidence that since this had been done, dust in large clouds had invaded the plaintiff's garden, rendering it impossible to use the garden, spoiling the fruit and vegetables, and obliging the plaintiff to keep the windows at the back of his house shut. It appeared that there had been disputes between the parties about a sum of 10*l.*, and that the plaintiff had then heightened a fence on his premises in a way which was objectionable to the defendant, who had, in his turn, heightened his own fence so as to obstruct the plaintiff's view; and it was alleged by the plaintiff, and denied by the defendant, that the carpet-beating had been carried on by the latter out of spite and by way of retaliation.

Mr. Graham Hastings, Q.C., and Mr. Eyre appeared for the plaintiff, and moved the court for an injunction; and Mr. Justice Kay said he had no hesitation at all in this case in granting an injunction to restrain the continuance of these acts. He thought that the acts of the defendant were a very great annoyance, and quite amounted to a nuisance within the language used by eminent judges such as Lord Justice Knight Bruce and Lord Selborne. He could quite believe that if this carpet-beating went on it would make the occupation not merely of the plaintiff's garden, but even of his house, very disagreeable. He had, therefore, no hesitation in granting an injunction restraining any carpet-beating on this particular place, or any other spot within the defendant's premises, so as to be a nuisance to the plaintiff.

(*Before* MR. JUSTICE FIELD *without a Jury.*)

Bird v. *Lord Greville.*

INFECTIOUS DISEASE AND FURNISHED HOUSES.

This was a case of great interest and importance to all persons taking furnished houses or apartments, as illustrating the risks of infectious disease occasionally incurred under those circumstances (*see* page 593). The evidence was to the effect that in March 1883

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Lady Greville was desirous of taking a furnished house in town for the season, and entered into negotiations, through Mr. Elgood, a house agent in Wimpole Street, to take the plaintiff's house, No. 25 Montagu Square, the plaintiff being at that time on the point of leaving for America. After seeing the house Lady Greville had a conversation with Mr. Elgood, in the course of which he stated that 'he thought the house would suit her,' and, on or about March 13, an agreement was signed by which Lady Greville agreed to take the house from March 28 to July 1 at 14 guineas a week. On March 10 it was found that a child of the plaintiff's was ill. Dr. Sewell, who was called as a witness for the plaintiff, saw the child about half-past nine in the morning of that day, and pronounced the disease to be measles. No mention of the fact was made to Lady Greville, although it was on this very day (March 10) that Mr. Elgood wrote to her ladyship accepting her offer for the house. A day or two after the agreement was signed Lady Greville again came to see the house, and finding the child in bed upstairs in a darkened room, according to her own evidence, asked the nurse what was the matter, adding 'nothing infectious, I hope.' To this the nurse replied that it was 'only a cold.' Subsequently Lady Greville learnt by accident that the child was ill with measles, whereupon, on March 20, she telegraphed to Elgood that, having heard that there was measles in it, she must decline to take the house. Mr. Bird himself had left for America on March 15, and nothing further passed between the parties until his return in August, when he wrote to Lord Greville, making a claim for 205*l.* 16*s.* as fourteen weeks' rent of the house, for which the present action was brought. The defence rested on the ground that it was an implied condition in the contract that the house was then in a habitable condition, and that the contract was avoided by fraudulent misrepresentation on the part of the plaintiff. Counsel for the plaintiff contended that it was sufficient if the house was in a habitable condition at the date of the commencement of the tenancy—namely, March 28, and in support of this argument medical and other evidence was given to show that after the child was removed on March 21 the room was thoroughly cleansed and aired, the curtains and other hangings removed, and the floor washed with disinfectants, and that by these precautions all risk of infection was at an end by March 28, if not earlier. This evidence was rebutted by medical evidence for the defendant, to the effect that, unless far more extensive precautions had been taken, the room would not be safe for occupation until a month after the child left it. It was an unfortunate feature in the plaintiff's case, on which the learned judge commented very strongly, that the house had been, in fact, let for a considerable portion of the time for which rent was claimed, though no notice was given of the fact to Lord Greville or his advisers until the plaintiff's counsel, in opening his case, were obliged to admit the greater portion of the claim to be untenable for this reason.

Mr. Justice Field, in giving judgment, expressed in very strong terms his disapproval of the conduct of the plaintiff in concealing the fact that there was infectious disease in the house down to and after the time when Lady Greville saw the child ill in bed. After reviewing the facts of the case, his lordship went on to say, with respect to the questions of law involved, that that relating to the alleged fraudulent misrepresentation was unnecessary for him to decide. It was well established by several cases (which his lordship cited) that it was an implied term in a contract of letting a furnished house that the house was in a fit state for occupation at the commencement of the tenancy. It followed from this that the question for a jury would be, Do you think that the premises were, on March 28, in such a state as to be fit for habitation? The learned judge then considered the evidence bearing on this question, the result of which, he said, was that it was uncertain how long the danger of infection would last, and that being so, he could not say, after the child had been ill in the room from March 10 to March 21, that on March 28 the house was in such a state that a person could live in it without risk. His conclusion, therefore, was that the defendant was entitled to judgment.

Judgment was given for the defendant accordingly.

Condensed Milk Prosecution at Birkenhead.

At the Birkenhead County Magistrates' Court, recently, Edward Penson, a grocer and provision dealer, New Ferry, appeared on an adjourned summons charging him with having sold a tin of condensed milk which it was alleged was not of the quality represented, the fat having been abstracted. On the former hearing of the case, Chief-Superintendent Egerton produced a certificate from Dr. J. Carter Bell, public analyst, to the effect that the milk was not a preserved or a condensed milk, but that 90 per cent. of the fat had been abstracted before boiling down with sugar. Mr. Bleakley, who appeared for the defence, challenged the analysis of Dr. Bell and asked for an adjournment of the case, in order that he might obtain further evidence as to the quality of the milk. The bench directed that a sample of the milk should be forwarded to Somerset House for analysis. The following certificate was now produced from the authorities there:—'Non-fatty milk, solids, and cane-sugar, 69·68 per cent.; fat, 10·84; water, 19·48; total, 100. From a consideration of these results, we are of opinion that no portion of the fat has been abstracted from the milk.' This certificate was signed by Messrs. J. Bell, R. Bannister, and G. Lewin. Mr. Bleakley said that several other eminent London analysts had supplied certificates confirming that from Somerset House, and Dr. Harland had come down from London specially to prove that no fat had been abstracted from the milk. The Anglo-Swiss Condensed Milk Company, for which he (Mr. Bleakley) appeared, sold thirty million tins a year of the milk, and had carried on business for sixteen years without a single information being preferred against them. As the expenses of the case would amount to about thirty guineas, he hoped the bench would allow to the defendant some portion of the costs. The magistrate, Mr. Ledward, said that the police had no doubt done their duty in endeavouring to protect the interests of the public by sending the tin and the milk to Dr. Carter Bell for analysis. That gentleman's analysis, however, had turned out to be very incorrect—at least the Somerset House authorities had pronounced it such. The bench had acted according to law in referring the matter to Somerset House, according to the certificate from which there was clearly no ground for convicting the defendant. As to the question of costs, they would be allowed subject to taxation. The summons was dismissed, the clerk being directed to tax the costs.

Insanitary Houses.

At Southwark Mr. Smith, of 98 Poplar High Street, the owner of six small houses in Bermondsey, was summoned by Mr. Thomas, the inspector of nuisances for that parish, for neglecting to put them in proper sanitary repair, after receiving repeated notices from the Vestry under the Metropolitan Management Acts of 1855 and 1862. Mr. Barstow imposed penalties amounting to 60*l.*, with 12*s.* costs. Mr. James Law, of 40 Kennington Road, the owner of Nos. 25 to 30 King Street, Bermondsey, was summoned for a like offence. Mr. Thomas said the defendant had been repeatedly warned, and had received notices, but had neglected to do the necessary work. Mr. Barstow imposed a similar penalty, with 12*s.* costs.

Supplying Adulterated Milk to a Workhouse.

At the Clerkenwell Police Court Messrs. Patey & Co., milk sellers, of Ferry Street, Lambeth, have been summoned by Sanitary Inspector Rouch for having, on the 18th ult., sold milk for consumption at the St. Pancras Workhouse which had been adulterated with 20 per cent. of added water, and which was deficient in butter fat to the extent of 60 per cent. The defendants were further

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summoned for having consigned milk to the same workhouse on the 22nd ult. which was adulterated with 14 per cent. of added water, and which was deficient in butter fat to the extent of 40 per cent. Mr. Ricketts, solicitor, prosecuted. Inspector Rouch stated that he attended the St. Pancras Workhouse on the evening of Sunday, the 18th inst., and awaited the arrival of the milk supplied to the institution by the defendants, who were the contractors. On four churns arriving in charge of a man witness took a pint of milk from one of the churns, placed it in a bottle, and afterwards submitted it to Dr. Stevenson, public analyst, who informed him that the milk contained 20 per cent. of added water, and was deficient in butter fat to the extent of 60 per cent. He stopped some more milk at the door of the workhouse again on May 22, and on another pint of milk being examined it was found to have been adulterated with 14 per cent. of added water, and was deficient in butter fat to the extent of 40 per cent. The manager to the company, who said he managed the business for Mr. Arnold Goldie, made the defence that the company sold the milk as they received it from the country. Mr. Barstow said this was a very bad offence, and he should impose the highest penalty. He ordered the defendants to pay a fine of 20*l.* on each summons, or 40*l.* in all, and costs.

Unwholesome Food.

At the Newcastle Police-court, John Angus, dairyman, and Margaret Crow, shopkeeper, were charged with having exposed for sale fourteen rabbits which were unfit for human food. Mr. W. Hedley, inspector, stated that his attention was directed to the rabbits on the stall where they were exposed for sale. He examined them, and found them putrid, and almost crawling with maggots, and totally unfit for human food. The inspector's testimony was supported by that of Mr. Armstrong, the medical officer of health, and the defendants, who had been previously convicted of similar offences, were now fined 5*l.* and costs. At the same time and place John Roy, a butcher, was also fined 5*l.* and costs for exposing for sale four sides and five pieces of veal in his shop in the market, the same being unfit for human food. The defendant had been fined for a similar offence in October 1880.

REVIEWS.

Legal Obligations in Respect to Dwellings of the Poor. By Harry Duff, M.A.

This handbook is one of the series issued in connection with the Health Exhibition, and is intended to point out what are the provisions of the Acts of Parliament dealing with the dwellings of the working classes. Much has been written lately on the subject, and many speakers and writers have advocated the necessity of sweeping legislation as the only way of getting rid of the unhealthy dwellings which admittedly exist in many of our large towns. Mr. Duff, in a work of ninety pages, gives an abstract of the powers and duties existing already, and indicates pretty clearly his opinion (which is shared by nearly every one who has had occasion to study the subject) that the evils which are complained of are due not so much to the absence of legal powers for dealing with them, as the negligence or inefficiency of those on whom the duty of administering the law is imposed.

The powers of the Common Law as regards nuisances, and still more the powers given for their suppression by the Public Health Act for England generally, and the Nuisances Removal Acts, as regards the metropolis, are very large, and, if fully enforced would themselves be sufficient to obviate most of the evils complained of. But they cannot work automatically; and, if neither parties interested, nor the local authorities choose to put the law in motion, a state of things which is forbidden may long go on unchecked. Mr. Duff points out that local authorities are ordered by law to appoint fit and proper persons to be medical officer of health and inspector of nuisances within their respective districts, and that it is evident that the words 'fit and proper persons' imply persons adequate in number as well as competent in experience to discharge the duties of the post. That nuisances are not detected and abated with greater readiness he attributes in great measure to the fact that these officers are too few in number for the work they have to do. 'Large numbers of benevolent people are voluntarily doing in the worst parts of London what the Acts define as the duty of inspectors of nuisances, going from house to house, endeavouring to discover the material causes which lead to misery and sickness, and bringing them to the notice of the medical officer of health. There is no lack of work for them to do, and the work which they do is nothing else than the work which the officers of health, or the local authority, by not appointing sufficient officers of health, have left undone.' In one respect the powers of the existing officers might perhaps be increased with advantage, viz., in the power of entering premises for the purposes of inspection and of ascertaining whether or not a nuisance exists calling for abatement. By the law as it stands at present, this can only be done between the hours of nine in the morning and six in the evening; and in case of nuisances caused by overcrowding the occupants are probably absent from the house, and the nuisance consequently less apparent than at other times. The law might perhaps be amended in this respect, but otherwise sufficient powers for dealing with nuisances already exist, and what is wanted is some means of obliging local authorities and their officers to put those powers in force wherever they are needed for the abatement of nuisances.

Mr. Duff devotes comparatively little space to the regulations as to cellar dwellings, new buildings, lodgings, and common lodging-houses; but he points out that under the regulations which have for some time past been generally enforced with regard to common lodging-houses, they have for the most part become healthy and comparatively respectable dwellings, instead of being the pestilential slums which they formerly were. Local authorities in the metropolis have now power to make by-laws for the regulation of lodging-houses which are not common, and outside the metropolis may have the same powers if they choose to apply to the Local Government Board for them; and thus may, if they choose, apply to houses let in tenements regulations similar to those which have been found to work well in the case of common lodging-houses.

A great proportion of the book is occupied with an analysis of the powers given by the Labouring Classes Lodging Houses Acts, the Artisans' Dwellings Acts (Torrens' Acts), and the Artisans' and Labourers' Dwellings Improvement Acts (Cross's). Mr. Duff points out pretty clearly the scope of these different groups of Acts, and of what may be done under them. He shows how a good many of the evils dealt with by Torrens' Acts may often be more easily dealt with as nuisances, without having recourse to those Acts at all; and like most writers who have dealt with the subject he attributes the comparatively small results which have been achieved to the fear local authorities have of incurring the necessary expenditure.

We cannot point out further the scope of this work. It promises to be a useful publication as giving the lay reader a means of obtaining some knowledge of the law affecting unsanitary dwellings, and of calling the attention of the proper authorities to defects which require to be remedied. But the work does not pretend to be, and should not be considered, as in any way a digest of or an index to the various statutes and reported decisions which deal with the subject. Some references are given, but we think the work would be much more useful if there were more of them, so as to enable the reader to turn readily to the books which contain the laws in question. Besides the bulk of the work, which has been compiled by Mr. Duff, there is a preface by Mr. Cohen, Q.C.,

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M.P. It does not attempt to explain or detail the effect of the existing laws, but suggests some alterations which the writer considers desirable, notably the establishment of a central authority for the metropolis. The opinions there expressed we must leave to the judgment of those who read the work.

Hints to Houschunters and Householders. By ERNEST TURNER, F.R.I.B.A. London: B. T. Batsford. 1883. Pp. 161.

AMONGST the numerous family of popular handbooks about health that have appeared of late, and the growth and multiplication of which the International Health Exhibition apparently fosters, we know of none that is so practically useful, so readable as the little book with the gay cover which Mr. Ernest Turner has issued through the agency of Mr. Batsford. Mr. Turner tells us in his preface that it was written somewhat hurriedly for a particular reason, and this may, perhaps, excuse amongst other things the absence of an index. But as the plea of haste is seldom of any avail to an author, and, in fact, sets him and his readers by the ears at the very beginning of their communion with each other, we trust that Mr. Turner, in the new edition which we are glad to hear has been called for, will take care to rectify the appearances of haste that crop up throughout the book.

Having said so much by way of blame, we have for the rest nothing but praise for the book. It is bright, chatty, readable, and complete. Mr. Turner is, as befits his reputation as a sanitary architect, perpetually on the alert to tell the intending householder what to do and what to avoid in every conceivable set of circumstances. We are only afraid that the searcher for the perfect house which Mr. Turner describes, with the proper aspect, the proper site, the proper construction, the proper disposition of rooms, the proper ventilation, and the rest of it, will have to give up his quest in vain in this London of ours, and will have to build a sanitary paradise of his own. Mr. Turner is not, however, destructive only; he is also constructive. He tells us, what few sanitarians deign to do, how to make the best of the circumstances in which we find ourselves, and from which only those who are indifferent as to the length of their builder's and plumber's bill can readily escape. He has a number of hints and suggestions, begotten of much contact with suburban houses and jerry-builders, which bring back hope to the householder, racked with the torment that his drains have not two openings for ventilation, that there is something suspicious about the connection of his cistern with the water-closet, and that perhaps that patent ventilating contrivance in which he has invested may have after all a certain degree of merit in it, even if its perpetual irritating noise does jar sadly upon his ears. Novelty of matter was hardly to be expected in the book; novelty in treatment it most certainly possesses; and even if the householder who buys this book obstinately maintains a healthy scepticism about bacteria and ground air and traps, and the like, and takes what is given to him in the way of drainage and water supply, and ventilation, without a sigh for the practically unattainable, he will still be grateful to Mr. Turner, and have more than his money's worth in the two final chapters of the book, which deal respectively with 'House Hunters,' and 'Lessors, Lessees, and their Liabilities.' Mr. Turner's words of wisdom on this last most significant and pregnant subject deserve to be engraved in enduring brass, for the instruction and warning of those unhappy mortals who periodically come within ear-shot of the syren promises of the house agent of civilisation.

A SANITARY service has been organised in Servia, which consists of a general sanitary council, of medical officers appointed in different districts, and a sanitary department under the jurisdiction of the Minister for Home Affairs. The Government has recently instituted a Public Health budget.

NOTES ON BOOKS.

Sixth Annual Report of the Association for Promoting Holiday Colonies of Poor and Weakly Children at Frankfort-on-the-Main.

IN 1883 the state of the society's funds enabled them to send a larger number of children than in previous years to pass a month in the Vogelsberg, Odenwald, and Taunus mountains, famed alike for their invigorating air and picturesque scenery. Out of 647 children (272 boys and 375 girls) recommended by the managers of the several elementary schools, 203 (96 boys and 107 girls) were selected, after a searching medical examination, and distributed in fourteen colonies, six of boys, seven of girls, and one of Jewish children of both sexes, the numbers in each colony ranging from twelve to sixteen.

The heavy rains and unsettled weather of last summer seriously interfered with the hitherto unrestrained frolics and rambles of the children in the beechen glades and over the heather-covered hills of the Taunus; but several hours daily were spent in the open air, and visits paid by one colony to another. More attention was perforce given to indoor games and amusements, in which singing, with, in the case of two colonies, instrumental accompaniments, took a foremost place; while some more studious boys made collections of plants or insects, or very fair maps of the district from their own observations.

The good effects on the health of the children, even of those who returned to homes situated amid the most unfavourable surroundings, was as marked as ever—as shown by their increased weight and height. The total cost, including over 100*l.* spent in honoraria to the fourteen teachers, printing, and advertisements, was, as in former years, a little over two shillings per day for each child.

La Propreté de l'Individu et de la Maison. Par Dr. E. MONIN. Paris: Soc. Franc. d'Hyg. 1884.

THIS pamphlet, which received the medal awarded by the Society, is a eulogy of cleanliness in the person and clothing, the houses and offices, the workshop and school; the consequences attending its neglect by the lower classes, especially agricultural labourers, are insisted on, and remarks made with reference to particular trades. But it is possible to weaken a good cause by overmuch advocacy; and though soap and water cost next to nothing, the ample wardrobes and the complete bathing arrangements recommended by Dr. Monin are beyond the means of all but the really affluent.

Cremation. By SIR H. THOMPSON. Third edition. With a paper entitled 'Cremation or Burial,' by SIR T. SPENCER WELLS, Bart., and the Charge of SIR JAS. STEPHEN. London: Smith & Elder. 1884.

SIR H. THOMPSON very fairly discusses the whole question of burial or cremation from the points of view of utility and of sentiment, showing that whether buried or burnt every particle of the solids of the body must sooner or later become food for plants, which in their turn serve for the reconstruction of other animals. That this process, when slowly performed, is not without danger to the health of the living is denied by few; that it is perfectly free from danger when rapidly completed is even more certain; man may by coffin and vault delay the process, but he cannot defeat the designs of Providence; why, then, should he try to do so, and not rather aid them?

From the sentimental side it needs no argument to show that the religious ceremony may be made as solemn and impressive as that of earth burial; or that there are circumstances in which the funereal urn presents many advantages over the grave. The only plausible objection that has ever been brought against the practice is that it may serve, by precluding the possibility of exhumation, to conceal crime; but besides the fact that exhumation is rarely resorted to, the risk may be minimised, and, indeed,

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in Italy it is already anticipated and obviated by requiring such a satisfactory explanation of the cause of death as to preclude the probability of any such necessity arising. Every exhumation is a witness to the slovenly manner in which the registration is performed, and the number of possible cases of foul play which may yet remain undiscovered under the present system.

The legality of cremation has been decided by Sir Jas. Stephen, and has been admitted by Parliament, although the latter might not think it convenient as yet to legislate on the subject.

A Dozen Papers on Disease Prevention. By CORNELIUS FOX, M.D. London: Churchill. 1884. Reprints of Papers published or Lectures delivered by the Author in recent years.

THE position of the unfortunate medical officer who, if engaged in private practice may, in the performance of his duties, give umbrage to his best patients, or, if devoting himself solely to the work of his office, may find himself, like the author, turned adrift simply because the sanitary authorities were the offenders against the public health, is the subject of the first paper, which is illustrated by some amusing instances. It is extraordinary that this inducement to a mere perfunctory performance of his duties, or even worse, on the part of the medical officer, should be allowed by a Government that would not permit it in any other department.

Papers on the worthlessness of the returns of sickness at present supposed to be made by parish surgeons, and the worse than worthlessness of any inference drawn from a statistical employment of these, with suggestions for the compulsory registration of sickness; cases illustrating the propagation of infectious disease by tradespeople, and, *ergo*, an advocacy of the notification of such diseases; and a paper on the duty of utilising the rain supply as a source of drinking water to cottages in rural districts where the poor are often dependent on stagnant and foul ditches, form the subjects of the next two articles. A good paper on the dangers of coke as a fuel in stoves, especially those made of cast iron and standing out in the room, from the escape into the air of carbonic oxide, is valuable and suggestive; and in others Dr. Cornelius Fox discusses the etiology of diphtheria and enteric fever, and the examination of air and water, &c.

Hints How to Avoid Catching Fevers and other Diseases. Published by the National Health Society. Price 1*d.*

THIS neat little pamphlet of sixteen pages is another of those useful domestic sanitary publications that the National Health Society issues with so much industry and success. The directions given are couched in the simplest and plainest language, and they appear to be as complete as it is possible to make them without destroying their simplicity.

Organisation of Convalescent Aid. First Annual Report of the Convalescent Committee of the Charity Organisation Society, 1884.

THE Charity Organisation Society is making a most praiseworthy attempt to systematise the admittedly defective administration of convalescent relief, and the interesting report recently issued gives a very satisfactory account of the progress made in a work peculiarly appropriate for the action of the society. While there are numbers of persons in our crowded cities to whom even a brief visit to the country would be of the utmost benefit, there are many convalescent homes and kindred institutions languishing for want of patients as well as want of funds.

The newly-formed Convalescent Committee of the Charity Organisation Society, while utilising the subscribers' letters placed at their disposal, wisely determined to make independent arrangements with the various homes, and by prepayment to reserve beds for longer or shorter periods. From the large number of convalescent cases coming under the notice of the several district committees there is no difficulty in filling vacancies as rapidly as they occur with deserving cases, selected after the careful inquiry which is the rule of the society. Upwards of 600 patients were sent to the country during June 1883 and the four following months, and the system is capable of indefinite extension. Indeed, it is suggested that a 'convalescent aid' system for hospital out-patients might advantageously be established upon this basis, thus avoiding the evils of indiscriminate charity, while affording a much-needed boon to a class by which it is now rarely attainable.

It appears that the average cost per bed is about 8*s.* 6*d.* per week, or 25*l.* per annum, and of this sum those patients whose means allow of it are required to repay the whole or part.

The Charity Organisation Society is to be congratulated upon the success which has so far attended its efforts, and there can be little doubt that funds will not be wanting to further so worthy an object.

NEW INVENTIONS.

THE NEW PATENT CEDAR FELT.

IN the SANITARY RECORD of March 15, 1882, a description was given of a new kind of paper felt, then recently introduced by Messrs. C. Davidson & Sons, Limited, the extensive paper manufacturers, of Morgie Moss Mills, Scotland, and Queen Victoria Street, E.C., which was adapted to a variety of useful purposes. A new description of felt has just been patented by the same firm, and called 'cedar' felt, an essence of that wood being incorporated in its substance. It has a distinct odour of cedar wood, and it is claimed by the makers that it will retain the aroma for years, owing to the peculiar arrangement carried out in the manipulation of the felt. The new production is intended for laying under carpets and floor-cloths, and will render them proof against moths and other insects. The advantages to be derived from the use of paper felt under carpets are generally known and acknowledged, but by adopting the cedar felt, the feature of protection from the ravages of moths is added to that of increasing the durability of the carpets. This felt appears to be quite as cheap as brown paper, a poor substitute, though often made use of; and the cedar felt probably only requires to become generally known to be extensively adopted.

A NEW CHIMNEY AND VENTILATING COWL.

NOTWITHSTANDING the numerous cowls and ventilating appliances extant, another constructed on different lines from any existing one has been invented by Mr. Frederick Leslie, M.Inst.C.E., and is manufactured by Messrs. Henry Marlow & Co., 127 Regent Street, W. It may be said without fear of contradiction that nothing produces so much annoyance in a household as a persistently smoky chimney, and there is probably no one thing on which more money has been spent in endeavouring to find a remedy. The patentee of the 'Leslie' cowl was requested to use his technical knowledge in inventing something that would secure freedom from smoke in a room in St. James's Hall, Piccadilly, the chimney in question having baffled all attempts to make it behave in a decent manner. The Secretary of the St. James's Hall Company states that for years it was impossible to have an open fire in the room, although different grates had been tried, including ventilating gas stoves; and various appliances from time to time had been fixed on the chimney top, but all to no purpose. The most unfortunate feature in the matter was, that the room in question was that used by the musical artists before and after appearing on the platform. The result of

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Mr. Leslie's attempts is the cowl illustrated below, and from the hour it was fixed (last November) until the present time, it is affirmed that not the slightest amount of smoke has entered the room, and from being the worst retiring-room connected with any place of entertainment in the Metropolis, it has become, in the opinion of the artists, one of the best. As will be seen by the illustrations, this cowl has, at the upper end of the pipe, a series of truncated conical shells, mounted one above the other, the lowest one being fixed as a collar round the top of the flue pipe, and the others supported from it over each other, and parallel to it by four equidistant radial partitions. Level with the top of the uppermost one, an annular metal plate is fixed, the opening in the centre of this plate being

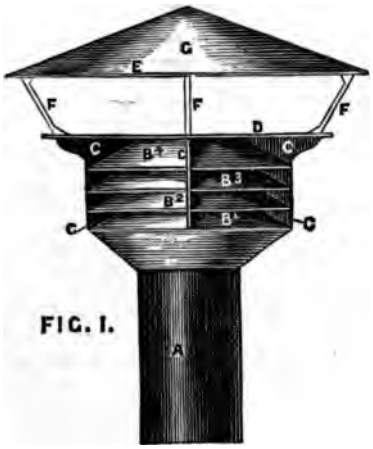

FIG. 1.

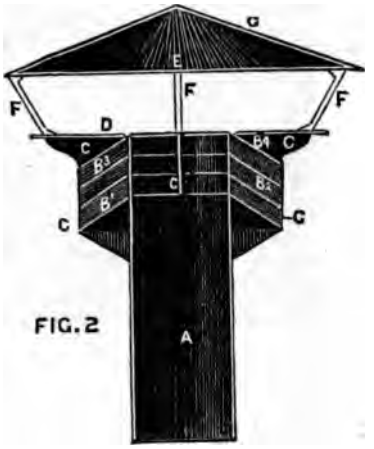

FIG. 2

somewhat larger than that at the upper end of the uppermost truncated cone, so that a space of about a half-inch wide is left all round between the parts. Finally a few inches over the top of the upper cone and parallel to the annular plate, there is another horizontal plate or disc which, if desired, may have a domed top to throw off the rain. The wind blowing against the parallel cone arrangement, causes currents of air to be directed upwards and outward between the horizontal plates at the top, and these currents carry with them the smoke ascending by the flue pipe. The radial partitions between the cones add much to the efficiency by concentrating the blast arising from the pressure of the wind on the windward side and directing it over the top of the flue-pipe to the leeward side. The cowl acts equally well as an exhaust ventilator. When fixed upon the offending chimney in St. James's Hall, the understanding was that if ineffective it was to be removed without cost to the company; it has been made, as it were, a test cowl by the inventor, and he has deferred its general introduction until thoroughly assured of its success; but so admirable has been its performances that the company have had others erected, and it is now in contemplation to fix a monster one over the central sunlight in the large hall as an exhaust ventilator. The writer has, through the courtesy of the Secretary, had opportunities accorded to him of visiting the room, on the chimney of which the cowl was first fixed, and of watching it. An excellent fire, exceptionally free from smoke, can now be obtained in the apartment, and it is stated that during the heavy gales last winter the same uniformity was observable. In fact, had the efficiency not been so decided, the company would not have ventured upon using more of the cowls. On such unimpeachable testimony, confirmed by the observations of the writer, Mr. Leslie's invention may safely be recommended to the notice of the public.

COMPRESSED AIR POWER.

ANY description of motive power which will enable the smoke and dirt and poisonous fumes associated with the use of steam to be dispensed with, will be one of the greatest boons possible to be bestowed upon such towns as Birmingham, and will at once inaugurate a distinct era of improvement in the direction of health, comfort and cleanliness. Therefore, any practical scheme that suggests such a possibility is worthy of encouragement and support. The advantages indicated are some of those claimed for the new system proposed to be utilised in Birmingham by the Birmingham Compressed Air Power Company, whose Bill for the organisation of the necessary powers has passed its third reading in the House of Commons. The principle involved is to centralise the production of power, which is transmitted from the central station wherever motive power is required in much the same way as gas and water are distributed. Though this will be the first application of compressed air in the manner and to the extent to which it is proposed to apply it in Birmingham, some experience has been gained in the working of the scheme in connection with tunnel-boring at Mont Cenis, St. Gothard, and other places, and in Paris, where compressed air has been some time in use for the working of a number of the public clocks. The scheme of the Birmingham Bill includes the three wards of St. Bartholomew, St. Martin, Deritend and Bordesley, where in March last year there were as many as 164 engines. Plant is to be laid down capable of providing 5,000 indicated horse-power. The cost of the buildings, plant, &c., is estimated at 140,000*l.*; and the air will be supplied at a pressure of four atmospheres. There is no doubt that if the calculations of the promoters are but realised, the new system will be productive of profit to the company, a considerably cheaper motive power for manufacturers, and much benefit to the community at large.

THOMPSON'S SMOKE-CONSUMING FIRE-GRATE.

THIS grate, to which allusion was made in the SANITARY RECORD of March 15, has now assumed a complete form, and is being exhibited at the International Health Exhibition amongst the grates in action. Visitors interested in the prevention of smoke, and economy in coal, should be careful not to overlook it when walking through the Eastern Gallery. The inventor, Mr. Thompson, of Marquess Road, Canonbury, is not connected with the stove-grate trade, but, being concerned in a business in which heating and boiling appliances on a large scale are in daily use, his attention has for some time past been

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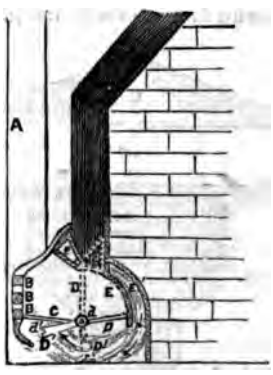
turned in the direction of the economisation of fuel, and the prevention of smoke; he has thus been induced to study the question in connection with domestic grates. The grate in question does not differ in outward appearance from an ordinary open fire register, and there is nothing whatever about it of a peculiar character to offend the eye. Illustrations are appended of it in elevation and section, and by means of the latter diagram, endeavour will be made to explain its principle. The fire-basket is divided into two parts, or, in other words, has at its back part a small box or chamber marked E, communicating with the front portion of the basket at the bottom, in which the fuel is placed, a cover marked *e* being pushed back in the direction of the dotted lines. The bottom of this chamber is a grid, weighted at the lower end DD, and pivoted at *d*. Consequently, when the chamber is empty the balance weight at the bottom causes it to assume a nearly perpendicular form, as shown by the dotted lines DD; but as this is never the case when any fire is in the grate, there is always a portion of it standing in a position to receive coals. On lifting the lid, *e*, and putting the coals in the chamber, their weight sends the grid bottom down, and the weighted part up, thus forming a compensating balance. In this chamber the coals are baked or coked, the smoke or discharged gases being obliged to pass down the chamber into the ashpit, and there mixes with the oxygen and passes up and through the burning fire, producing perfect combustion and utilising all component parts of the coal, instead of allowing it to pass into the chimney and out in the atmosphere, thus effecting great economy in fuel. The balance weight in front is of course always exerting its influence in endeavouring to force up its lighter end or grid, which has the effect of sending the coals forward into the front fire. Thus its action is automatic, and it is really a bottom feeder with this advantage, that the fuel is robbed of its smoke-producing components before it is brought to the fire. The visitor who wishes to test the smokeless character of this grate can at any time do so unobserved. He has only to note its position, and enter the open avenue running parallel with the gallery, and he can watch the quantity of smoke emerging from each flue-pipe, and he will find that, go whenever he will, there is less from the Thompson Grate than from any other. The truth is gradually becoming acknowledged by practical men, that to prevent smoke in open grates the smoke-producing gases must be separated from the fuel before it is burnt in the grate, and the most effective and easiest mode of doing this, coupled with automatic action, appears to offer the best solution of the problem how to prevent smoke in open grates. That Mr. Thompson is on the right track is beyond a doubt, and the interest that is being taken in his grate by members of the trade shows that the idea finds favour with those most conversant with the subject. The principle has also been applied to a kitchen range, which is in action on Mr. Thompson's Stand, only smoking when it is opened to show visitors the arrangement; and if the coals being put in the coking box by the cook instead of on the top of the fire can only be made a matter of certainty, a desideratum will be obtained, since the kitchen-range is the worst behaved of the stove or grate families in the production of smoke. The cook, however, would soon find it to her advantage to feed the fire in the proper way, for, instead of a smoky fire, constantly requiring raking or poking to secure a clear surface, she has that necessity of good cooking always provided for her, by this invention. In fine, the success of the Thompson Grate depends upon the coal being put in the proper place, and as it is as easy to do right as wrong in this matter, any individual adopting this grate, and then ignoring the one only condition necessary for its working, is certainly no friend to the smoke-abatement movement.



CORRESPONDENCE.

[All communications must bear the signature of the writer, not necessarily for publication.]

THE SMOKE TEST FOR DRAINS AND AIR CURRENTS.

Within the last two years the testing of drains by the application of smoke, blown into the drains by a smoke-producing machine, has become pretty general; and has been and is productive of a great deal of good to house-holders by showing where bad and leaking drains existed, and is forcing tradesmen to make a better job of their drainage work than has generally been the case hitherto. In many cases now, in executing new drainage work, it is part of the agreement or understanding that the drain-pipes are not to be covered up until the smoke test has been applied to see that they are all right, which forces the workman to make a good job. The application of the smoke test in this case is generally quite easy. In applying the smoke test to the drains of old houses, however, or of houses already occupied, it is sometimes very difficult to get the smoke to show itself in the house, even when the drains are leaking, and allowing foul air to often blow into the house. This is especially the case when there is no disconnecting trap on the drain between the house and the sewer, in which case it sometimes happens when testing that all the smoke blown into the drain or soil-pipe is sucked back out of the house into the main drain or sewer, and unless it is discovered that this outward current of the air is going on, and something done to stop it, a house might be smoke tested and certified as being all right, although the drains may be very bad.

I had an example of this a few days ago, where I was examining a house for the tenant, who complained of

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being often troubled with bad smells, and wanted the drains examined without disturbing anything, as the landlord and he were at loggerheads. The main drain went along the front of the house, and no traps were seen anywhere there, and nothing was to be touched there. The smoke test was therefore applied to a rain and waste-water pipe at the back of the house, when the smoke passed into the drain quite freely, and showed itself about fifty yards away from the house, but neither the smoke nor its smell came into the house, although there were several fires on, and all the windows and doors shut. In the act of opening the front door a small puff of smoke was observed for a moment, but no more could be seen, although a large quantity of smoke was being blown into the drain. This looked as if there were little wrong with the drains; but, not being satisfied, I emptied the trap of the water-closet upstairs—the soil-pipe had no ventilating pipe—and bringing the smoke machine into the house, the smoke was applied at the top of the soil-pipe, when it was seen that, owing to some strong current of air which was passing through the main drain outside, the hot air and smoke from the smoke machine were sucked right down the soil-pipe and away out of the house, so that, while this suction outwards was going on, the smoke test might be misleading. Upon opening the front door again, the smoke now came pouring out into the lobby of the house from under the ground, showing that the drains were really leaking, but that at times there would be no bad smell blowing into the house, while at other times there would be, according to the direction of the wind or other atmospheric causes.

Had there been a disconnecting trap with sufficient water lock between the house and the main drain or sewer, I expect the smoke would have filled the house in a few minutes; but such not being in, and I being prevented from digging down to the drain in front, the difficulty in testing satisfactorily, as above explained, was the result. I mention this, as the above experience may be useful to others, while it is also an instance of warm air descending rapidly where it was expected to ascend easily.

W. P. BUCHAN.

21 Renfrew Street, Glasgow.

EFFECTS OF THE EDUCATION ACT ON THE HEALTH OF ADOLESCENTS AND THE SANITATION OF WATERING-PLACES.

The last number of the SANITARY RECORD contains an article which is first in place and first in importance; and upon the subject of which I have long felt almost under compulsion to write to you. I could not have written anything so just, so dispassionate, or so convincing as Dr. Rabagliati has written, however, and I only wish now to offer my mite of testimony endorsing all his sentiments. There can be no doubt that the evil he speaks of is widespread, and that it is the *system* which is to blame. During the past twelve months I have signed at least as many certificates to exempt children from school attendance, and at the present moment there are four of my patients' children whom I have been obliged to refrain from school attendance altogether. I find the strain is most felt between the ages of nine and thirteen, and is experienced equally by boys and girls. When the school strain is taken off they rapidly spring into good health, and regain the elasticity of spirits and temper which characterises the feeling of wellness. On the other hand, when the strain is put on again, ill-temper, peevishness, and moroseness supervene, and are rapidly followed by headaches, dyspepsia, eye pains, muscular inco-ordinations, limb startings and dreamings, and, finally, a definite febrile reaction portending an organic lesion somewhere. It seems to me that what is wanted is a classification of all school children according to their physical capacities, shorter hours for all, and increased development of the gymnasium.

Another subject which it was refreshing to see plainly dealt with in your last issue is the sanitary condition of watering-places; and it is a coincidence that a letter from myself dealing with a different aspect of the matter appeared in the *Lancet* of May 10. Children are generally the first to suffer when anything is amiss with the sanitary arrangements of these places.

ROBERT PARK, M.D.,
Medical Officer for 3rd and 4th Districts, Glasgow City Parish, and late Physician for Diseases of Women and Children, Anderson's College Dispensary.

INGENIOUS MALPRACTICES.

A recent experience of wilful carelessness in sanitary workmanship may be as instructive to your readers as it has been to myself. Having been consulted as to a suspected defect in a house drain, I poured a suitable quantity of ether, followed by a little water, down the ventilating pipe which was fixed at the extreme end of the drainage system. All the traps were properly fixed and of approved kinds, the sink and other wastes were disconnected, and although the whole of the drain (which passed through the house from back to front) was not exposed to view, no ether escaped at any point, so far as half a dozen keen and anxious noses could detect. Still unconvinced, a more radical examination was made, when the ventilating pipe was found to be a dummy running into the ground, against, but not into the drain, so that all the ether had soaked into the earth, and none had passed into the house drain. A further application of ether properly introduced into the drainage system, indicated an imperfect joint in the pipes which allowed sewer gas to enter the dwelling.

This case appears to be worthy of association with the notorious instance in which a workman had plugged up the outlet of the ventilating pipe with his handkerchief, as the smell annoyed him.

CHAS. E. CLAYTON.

152 North Street, Brighton,
June 9, 1884.

COSTLESS VENTILATION.

In your last number a letter appears from Dr. Hinckes-Bird concerning costless ventilation, by raising the lower sash. Perhaps the word implying a simultaneous hitting upon this method by himself and Sir Robert Rawlingson was too pointed; and he might have been the first to publish it, but I know that Sir Robert has practised it for years past, and, when I have more time, I will endeavour to settle this little question. Meanwhile, any error can be settled in reprinting.

June 11, 1884. The Writer of the Paragraph.

SANITARY JOTTINGS.

SANITARY.

PORT OF LONDON SANITARY COMMITTEE.—By a recent Warrant of the Treasury the limits of the Port of London have been greatly extended. The result of this Warrant is to place under the jurisdiction of the Port Sanitary Committee of the Corporation of London an additional district of from twenty to thirty miles in length, including the important ports of Sheerness, Queenborough, and Port Victoria.

The average death-rate of the Haltwhistle Rural Sanitary Authorities' District for the quarter ending March 31, 1884, was 15·185 per 1,000 per annum. The deaths from zymotic disease averaged 1·5 per 1,000.

Dr. Jackson, Medical Officer for Hexham, reports that the death-rate of that township for the quarter ending in April last is only a trifle over 12 per 1,000 per annum.

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Scarlet fever still forms 75 per cent. of the cases of infectious disease reported fortnightly to the medical officer of health of Newcastle. During the fortnight ending May 24, 14 cases of small-pox were also reported to that officer by medical practitioners in that city.

M. Ch. Girard, in a memoir presented to the *Société de Médecine Publique et d'Hygiène Professionnelle*, suggests that the Administration should organise model stables where milch-cows would be surrounded by the best hygienic conditions, and fed on carefully chosen food. New-born infants would thus be supplied with good milk, presenting always the same proportion of its component parts.

The *Bulletin Municipal* announces that sixteen of the Paris thoroughfares are to be paved with wood.

The Court of Common Council of the City of London have increased the salary of Dr. Collingridge, the medical officer of health, from 500*l.* to 700*l.* per annum, as from Christmas last.

SEWERAGE.

THE SEWERAGE AND MAIN DRAINAGE OF THE METROPOLIS.—The report of the proceedings of the Metropolitan Board of Works during the past year shows what has been done in connection with the sewerage and main drainage of the metropolis. In view of the great growth of London, a number of supplementary main drainage works were found to be urgently required, and during the past year new sewers were constructed as follows: Two storm overflow sewers, one from Clapham to Vauxhall Bridge and the other from Kennington Church to Vauxhall Bridge, with outlets into the river, at a contract price of 65,000*l.*; and an overflow sewer in Church Street, Deptford, discharging into Deptford Creek, at a cost of 33,990*l.* (see below). The new main sewer from Roehampton Lane, Putney, to the Clapham Road, with branches running into it at various points, is now in course of construction. The length of the main line is about five and a quarter miles, and, including the branch sewers, the total length is about eight miles. The contract for the works was entered into in August 1882, and the contract price is 151,995*l.* In addition new sewers have been planned for the relief of the Ranelagh and King's Scholars' Pond district. The contract for this work was entered into last April, the price for which the work was undertaken being 96,300*l.* The new sewer will begin by a junction with the King's Scholars' Pond sewer in Clarges Street, Piccadilly, and passing thence under Piccadilly, Knightsbridge Road, Sloane Street, Sloane Square, Lower Sloane Street, and through the grounds of Chelsea Hospital, will terminate by an outlet into the River Thames in front of those grounds. A length of about 1,700 ft. of sewer has been constructed. Since the year 1871 the cleansing of the main and intercepting sewers (in all about 250 miles in length) has been done by a special staff of men employed by the Board for the purpose. The number of men employed is 124, of whom 18 are foremen or gangers, and the cost of the work during the past year was about 14,000*l.*

STORM OVERFLOW SEWER FOR SOUTH LONDON.—Some parts of the South of London have particularly suffered from the overflow of water when there are floods, therefore the Metropolitan Board of Works have made arrangements for a new sewer to carry off storm water. This additional sewer, which is by far the largest in the metropolis, has been constructed at Deptford, where the sewers of South London carrying off the surface water converge, and it is destined to be a relief when necessary to the ordinary outlet at Deptford Creek. The length of the sewer is about 3,300 ft., and it is 13 ft. 6 in. wide and 11 ft. high, being quite large enough, indeed, to admit of the passage of a railway train or omnibus. It is constructed of Portland cement, faced with substantial brickwork, and it is intended to take the storm-water from the present outlet into the Deptford Creek, near the Deptford Broadway, to the Thames, to a point nearly in the middle of the river, where the water will be discharged. The old sewers, to which the house-drains were connected, have all been broken up, and a new sewer, 3 ft. by 2 ft. 7 in., placed underneath the large storm-water sewer, so that all house drainage is carried through an independent sewer to the low-level pumping-station at Crossness outfall. The new sewer has been constructed under a very narrow street, and the sides of it were in some places quite close to the houses. Owing to the care exercised by the contractors, Messrs. Pearson and Son, of Bradford and Westminster, no damage whatever has been done to the property on either side of the street, notwithstanding that some large and heavy buildings were passed. It is worth noting that all the bricks used were of a standard measurement, in order to insure the use of whole bricks only. The tunnel has several curves and one double curve, and these have been carried out with mathematical accuracy. The sewer not only appears substantially built, but well designed for the purpose of carrying off the vast floods of water that fill the local sewers after a heavy rainfall. It is worthy of notice that since 1859, when the drainage works were completed, the water-level of the soil has been reduced 30 feet, which has had an important bearing on the question of pumping. The present work is an important addition to the sewer arrangements for South London.

The Corporation of Sheffield are engaged in carrying out a system of main drainage which will involve a large expenditure. Fifteen firms from Sheffield, Manchester, Leeds, Bradford, and other towns competed for the construction of the purification works which are to be erected below the town, and the contract of Messrs. Bissett, a local firm, which amounted to 23,960*l.*, was recommended for acceptance. The highest tender was 42,541*l.*

WATER SUPPLY.

The town of Stevenage is about to be supplied with pure water from the water-bearing stratum of the chalk, a copious and constant supply for its 3,000 inhabitants having been a want of long standing. Messrs. Bailey Denton, Son, & North, of Whitehall Place, are the engineers for the scheme, and Mr. Tilley, of Walbrook, London, has been intrusted with the well-sinking.

THE HOUSING OF THE POOR.

'How best to help the slender store,
How mend the dwellings of the poor?'

Mr. PAUL KARKEEK, the health officer of Torquay, has of late been investigating the circumstances of the homes of the working classes of his district, and in his report on the subject he shows that, as might be expected of a town situated like Torquay, there is a complete absence of the horrors described as existing in the metropolis. The few cases of overcrowding that were discovered were, in too many instances, co-existent with great poverty, and, consequently, must be treated cautiously, especially when there are signs of the occupants trying to keep the houses clean. The sanitary circumstances of the tenement dwellings were, with the exception of uncleanliness, alike on the part of owner and occupier, fairly satisfactory. It should be noted in this connection that typhoid fever is exceedingly rare among the poorer classes in Torquay, and this is attributed to the absence of privies, closets, &c., within the buildings, and to the excellent supply of drinking water, which is but seldom contaminated in tenement houses. Mr. Karkeek strongly advocates the adoption of a code of regulations for houses let in lodgings based on the Government model. By their aid the authority will be able more strictly to define the landlord's duty in respect to these houses, and see that, at

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all events in some instances, something more is done than to receive rent.

AT a recent meeting of the Field Lane Refuge and Ragged Schools, the Earl of Shaftesbury, who presided, referring to the domiciliary condition of the people, said that that had been his hobby for many years, and he should harp upon it to the end of his life. He maintained that all the sanctity of domestic life depended upon the improvement of their domiciliary condition. There was nothing on the face of the earth so utterly abominable as the one-room system. That evil had of late years increased owing to the street improvements, which, however beautiful they appeared, involved a great amount of misery and suffering on those who were displaced and driven to rooms already overcrowded. He had seen as many as four families residing in one room, and it was impossible to carry on their domestic duties in such conditions with any regard to decency, morality, and health.

IT is understood that Sir Charles Dilke has received a report from Mr. J. T. Harrison, one of the engineering inspectors of the Local Government Board, relative to the working of the Artisans' and Labourers' Dwellings Improvement (Sir R. Cross's) Acts in England. The inquiries of the inspector were confined to London, Birmingham, Wolverhampton, Liverpool, Norwich, Swansea, Walsall, and Nottingham, which are the only places where improvement schemes under the Acts have been carried out. The report shows that the working of the Acts has been very generally destructive of the dwellings of the poor, but hardly in any degree constructive, for in only a few instances have dwellings been erected suitable for the working classes who have been displaced. A number of artisans' dwellings have been erected, but few of the working classes who have been displaced are occupying the new homes, for it is found that they cannot afford to pay sufficient rent. When the occupants of condemned dwellings are turned out they go to other parts of the town, carrying with them their degraded habits, and deteriorate the property in their new locality, so that the courts and alleys into which they crowd together are found to be in a somewhat similar condition to the places from which they had been removed. As regards the population of the metropolis, the inspector concludes that it is of the greatest importance that the displaced populations should be provided for, on account of the greater density of the people as compared with provincial towns, though in less populous places the strict enforcement of the provision is not so much called for. The report concludes by saying that the generally expressed unwillingness of the authorities who have carried out these schemes to engage in further enterprises of a similar character is probably the best answer that can be given to the question, Whether the several schemes were justified, considering the resources of the authorities?

THE fourth annual meeting of the Nineteenth Century Building Society was held on the 30th ult. at the Cannon Street Hotel, Mr. H. Waldemar Lawrence in the chair. The annual report, which was read by Mr. Frederick Long, the manager, showed a large increase of business in every department. Since the issue of the last report 10,000*l.* had been added to the share capital during the year, and nearly 4,000*l.* to the deposits, while the amount secured by mortgage was 40,445*l.* on March 31, 1884. The chairman proposed the adoption of the report, and congratulated the members on the present position of the society, which, with all the costs incidental to the formation of a new society, had from the first paid to its members a steady dividend of 5 per cent., leaving a small balance to be carried to next year's account. Mr. Mark H. Judge, in seconding the adoption of the report, referred to the attention the directors gave to the state of the property proposed to be purchased through the society. In all cases a report in writing on the sanitary condition of the houses surveyed is supplied, setting forth such alterations as may be necessary to remedy serious defects. This feature of the society has been so much appreciated that the directors attribute their success largely to it. The chairman and manager, having answered several questions put by members, the report was adopted unanimously. On the motion of Mr. F. H. A. Hardcastle, seconded by Mr. Henry Rutt, the retiring directors, Mr. Mark H. Judge and Miss Eliza Orme, were re-elected.

THE *Builders' Weekly Reporter* gives the following as a fact:—One of the questions asked a ragged little girl of eight, at a recent school examination, was, 'Why were Adam and Eve turned out of Paradise?' 'Because they didn't pay their rent,' was the prompt reply. On inquiry it appeared that the poor child's parents had been evicted several times from their paradise for the same reason.

A REMARKABLE case of overcrowding is instanced by Mr. W. Cameron Morris in a recent report on the rural district of Chester-le-Street. He discovered that a man, his wife and family—always three and sometimes five in number—inhabited a disused 'summer-house,' the dimensions of which were 11 feet by 6 feet 9 inches and 6 feet in height. The man was summoned, but eventually had to be ejected, and the house was pulled down.

PARKS AND OPEN SPACES.

The law condemns both man and woman
Who steals the goose from off the common;
But lets the greater felon loose,
Who steals the common from the goose.

THE NEED OF NEW PARKS FOR NEW YORK CITY.—The report of the Commission appointed to select and locate lands for public parks in New York states that it is now twenty years since Central Park was created, and since that time the population of New York has increased by a million of souls. No large city in the world is increasing in size more rapidly than New York, which doubles its population every seventeen years. Hence, every year the provision for more parks becomes additionally necessary. It is proposed to add three large parks and several smaller ones to those already possessed by the city. The total area of these additions is 3,808 acres, which will make the entire park area of the city nearly 5,000 acres, or about one acre to every 300 inhabitants. The report points out that the main advantage in these proposed parks, from a hygienic point of view, will be their effect in drawing the centre of population upward, and relieving the fatal crowding which is now the curse of New York. In the Fourth Ward of this city the population is packed in at the rate of 240,000 per square mile; and the Sixth, Eleventh, and Seventeenth Wards are nearly as crowded. There is nothing like this elsewhere in the world. Forty thousand persons die in New York city during the year, and nearly one-half of these are young children; while in other cities, with a smaller general death-rate, the proportion of children's deaths is only one-third.

THE Select Committee of the House of Commons appointed to consider the Ennerdale Railway Bill, have thrown out the scheme. The Bill proposed to sanction a line from Frizzington to Ennerdale, going through one of the most beautiful parts of the Lake District. The objection to the scheme was that it would injure the scenery.

PUBLIC GARDENS AND RECREATION GROUNDS IN LAMBETH AND MILE END.—The ancient burial-ground of Lambeth, situate in the High Street, and which is surrounded by a poor and densely-populated neighbourhood, has been opened as a public garden and recreation ground for the use of the inhabitants. For many years this spot, about two acres in extent, has been an eyesore to the district, but, under the superintendence of Mr. Hugh M'Intosh, it has been cleared and planted with trees and

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shrubs, with asphalte footpaths, provided at a cost of 1,000*l.*, half of which will be borne by the Metropolitan Board of Works. Owing mainly to the exertions of the Metropolitan Public Garden, Boulevard, and Playground Association, another playground has been freely opened to the poor children resident in the densely-crowded district of All Saints, Mile End New Town. A large space which adjoins the parish church in Buxton Street has been asphalted, and supplied with swings, horizontal bars, and other athletic apparatus for the recreation of the juvenile population of the locality. The entire cost incurred has not exceeded 200*l.* Owing to the exertions of the Metropolitan Public Garden, Boulevard, and Playground Association, who have provided seats and an extra caretaker, the extensive churchyard surrounding St. Dunstan's, Stepney—some five or six acres in extent—has been thrown open to the public.

THE *Health Journal*, for May 1, presents its readers with a coloured lithograph giving the perspective and plan of the playground in Orchard Street, Pendleton. It belongs to the firm of Sir Elkanah Armitage and Sons, and is a little less than an acre in extent, being 120 yards long by 30 yards wide. Some three years ago, being still unoccupied, it was determined by the owners to try and utilise it temporarily for the benefit of those who lived in the crowded neighbourhood adjoining. The land was accordingly levelled, drained, gravelled, and surrounded by wooden palisadings. The walls are frequently limewashed, and have their appearance relieved by ivy and other creeping plants. To add to the general cheerfulness of the place, a broad bank of grass runs entirely around it, and in the centre of the ground, and dividing it into two parts, is a handsome wooden pavilion or shelter, surrounding which are also grass banks with flower beds. One half of the playground is devoted to a gymnasium, consisting of seesaws for children, swings for boys and girls, horizontal bars for youths and men, parallel bars, &c., and in this part is also a large heap of sand, digging in which affords great enjoyment to the very young children. The other half of the ground is devoted to quoits, skittle alley, spring boards for high and long jump, and in the centre of this part is a raised platform, around which are grass and flower beds. A local band voluntarily plays here one evening weekly during the summer months. The cost of the ground is stated by Mr. G. A. Southam, of the firm of Sir Elkanah Armitage and Sons, to be a little under 1,000*l.*, and the annual cost of maintenance (keeper's wages, repairs, &c.), exclusive of rent, 83*l.* Mr. Southam on a recent occasion said in relation to this playground: 'On the evening the band played, there were often 1,200 to 1,500 people present. The playground was open to every one; all sorts and conditions of men, women, and children frequented it, and though the rough element was strongly represented in the neighbourhood, the caretaker, who was always present, had no difficulty in preserving order, and it was gratifying to state that never had any wilful damage been done to this property—not a shrub had been injured or a flower plucked.'

THE Duke of Westminster has thrown open the whole of the charming grounds and gardens of Eaton Hall on Sundays to the labourers on the estate on production of tickets. The public during the week already enjoy the privilege of access to a great portion of the park and grounds alongside the Dee, while admittance can be obtained to the hall during the greater part of the year on payment of 1*s.*, which his Grace afterwards contributes towards the fund of the Chester Infirmary.

BY permission of the Benchers, the Inner Temple Gardens will be open to the public on and after Monday next during the months of June, July, and August, from six to nine o'clock every evening.

THE Metropolitan Board of Works have recently sanctioned week-day band performances in an allotted portion of Finsbury Park, and it is proposed by those who have taken the matter in hand that these performances shall take place on two evenings in the week. The performance will be given each Monday and Saturday evening until further notice. There are charges for programmes and seats, out of the proceeds of which the expenses are to be defrayed. The Sunday Band has also commenced its season in Finsbury Park, so that it would seem that the working classes in the north of London are better provided for in the matter of *al-fresco* music than their brethren at the west.

THE Corporation of Newcastle are negotiating with the owners of the land adjoining Elwick Park with a view to a purchase for further extension of the park, conformably with the recommendation of the Parks Committee of the Corporation.

CREMATION NOTES.

CREMATION IN CHINA.—In the last issue of the Chinese Imperial Maritime Customs Medical Reports, Dr. A. Henry contributes some remarks upon cremation in that country. Marco Polo repeatedly asserts that the Chinese wherever he travelled were in the habit of burning their dead; on the other hand, Chinese historical works make no mention of the practice, and burial is the almost universal custom at present. The books in which the subject of cremation in China is treated only speak of it as being practised upon the bodies of Buddhist priests and lepers. In only one, however, of the many Buddhist temples at the town where Dr. Henry is stationed are the bodies of the inmates burned after death. The method of incineration is commendable as efficient, æsthetic, and inexpensive; but it is too slow except for Buddhist priests in China. In the grounds of the temple is a small dome-like edifice, the interior of which communicates with the open air by a small door only—a charcoal kiln, in fact. The dead priest is placed in a sitting posture inside the dome, and charcoal and firewood are piled around him; fire is applied, and the door is shut until combustion is complete. Children are sometimes cremated, but for superstitious reasons only. When several young children of a family have died in succession, the body of one of them is burned under the belief that this ceremony will insure the survival of the next child born to the family. In these cases the body is simply brought to an open field in a box and placed upon firewood, which is ignited. China and India are pre-eminently countries in which a rational system of cremation might be encouraged with much advantage.

MAINLY through the efforts of Dr. Felix Formento, the citizens of New Orleans have organised a cremation society of forty members. New Orleans, more than any other city, needs a safe method of disposing of her dead, to take the place of the present system of entombment.

THE New York Cremation Society, notwithstanding the prejudice which exists in America against the burning of human bodies, is determined to promote and popularise this manner of disposing of the dead. The repugnance to incineration, it is thought, is gradually decreasing, and with time, which works much greater wonders, people will grow quite accustomed to cremation ovens. Therefore, land has been purchased on the highest and most picturesque grounds on Manhattan Island, where a furnace is to be erected to reduce departed friends and relatives to ashes. The cemetery will be, if present plans are carried out, more complete than anything of the kind in the world. It is expressly wished to deprive it of the mournful aspect usually associated with burial-grounds, and to this end there are to be no yew or willow trees planted, nor any emblems of mourning. A handsome chapel for memorial services is to be built, and the grounds are to be tastefully laid out, and adorned with flowers. Nor will there be, we gather from the American papers, any wasting or burning of the bodies, but human remains

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will be incinerated by an 'intensely hot, dry air, radiating from furnaces fifteen feet distant, which will in a short space of time reduce the corpse to a heap of ashes.'

THE remains of the late Dr. Samuel D. Gross were cremated at the Lemoyne Furnace, Washington, where his wife's remains were recently cremated. The ashes weighed about seven pounds, were hermetically sealed in a tin box, and placed in the coffin in which the body was carried to Washington, and taken back to Philadelphia where the coffin was removed to the late residence of Dr. Gross, and subsequently the ashes were enclosed in a marble urn about three feet high, unornamented and without inscription, and placed beside the coffin of Dr. Gross's late wife in the family vault. The Rev. Dr. Charles Currie read the Episcopal burial service at the cemetery.

A CORRESPONDENT of the *Glasgow Herald* relates the following anecdote in relation to cremation. An Englishman, holding forth in a Scotch hotel on the subject of the cremation of bodies in place of the present mode of burial, wound up by declaring that he had made up his mind to leave directions with his executors and friends that when he died his body should be burned. A canny old Scotchman, who did not relish the innovation, 'set the table in a roar' by remarking, 'Ye seem in a great hurry about that business, ma freen. A' that may possibly be ordaned to be dune, without ony bother to your friends or executors, in the Lord's guid time and pleasure.'

AT the last meeting of the City Commissioners of Sewers, the Sanitary Committee reported on the reference to consider whether it was not advisable that a proper crematorium should be erected at Ilford Cemetery in order that the public might adopt that mode of sepulture if they so wished. By the courtesy of Sir Henry Thompson, Sir Spencer Wells, and other members of the Cremation Society of England they were enabled to observe the cremation of a horse at the crematorium at Woking belonging to that society. In the meantime a Bill was introduced into the House of Commons with a view to regulating the proceedings in the cremation of the dead, but it was rejected on a second reading. In these circumstances the committee thought it was inexpedient to erect any apparatus for the purposes of cremation at Ilford until that mode of disposal had been regulated by Parliament and had its approval. The consideration of the report was deferred.

A ROMAN CREMATORIUM.—Some workmen engaged in excavations in the bail within the boundaries of the old Roman city at Lincoln lately came across a crematory furnace and a sarcophagus. In the latter were found ten urns, which contained dust and calcined bones. The urns were of different sizes and shapes, and were all provided with saucer-shaped covers. Only one of them, however, was got out perfect. The interior of the sarcophagus was lined with long thin bricks, which perished on being exposed to the air.

CONGRESSES.

A HYGIENIC INDUSTRIAL CONGRESS will take place at Rouen on July 26 and 27. The questions discussed will relate to Hygiene for the working classes, in factories and at home.

COMPETITIONS.

MR. W. PICTON, of Liverpool, who was appointed by the Newcastle Corporation to decide upon the designs sent in for the erection of baths and washhouses in Scotswood Road, Byker, and Arthur's Hill, has announced his award as follows:—For the Scotswood Road site: First, Messrs. Gibson & Allen, Newcastle-on-Tyne; second, Messrs. Clark & Moscrop, Darlington; third, Messrs. Tate & Popplewell, Manchester. For the Byker site: First, Messrs. Gibson & Allen, Newcastle-on-Tyne; second, Messrs. Clark & Moscrop, Darlington; third, Mr. J. W. Dyson, Newcastle. For the Arthur's Hill site: First, Messrs. Gibson & Allen, Newcastle-on-Tyne; second, Messrs. Clark & Moscrop, Darlington; third, Mr. Alfred Darbyshire, F.R.I.B.A., Manchester. The limit of cost, exclusive of sites, was fixed at £24,000.

GROCER'S COMPANY RESEARCH SCHOLARSHIP.

AT a Court of Assistants of the Worshipful Company of Grocers, held on May 21, 1884, the following candidates were elected to the Company's Scholarships for Research into the causes of important diseases, viz.:—1. W. North (Renewal). *subject*—Œtiology of Ague. 2. Leonard C. Wooldridge, D.Sc., M.B., *subject*—Hæmorrhagic Disease, Pernicious Anæmia, and Blood Clotting. 3. Alfred Lingard, M.R.C.S., *subject*—Intimate Œtiology of Enteric Fever.

HEALTH EXHIBITION PRIZES.

MR. J. SARGRANT STACEY has placed the sum of £20 at the disposal of the Council of the Society of Arts for a prize to be offered in connection with the International Health Exhibition, and it has been decided to offer the prize for the best exhibit in Class 30 (objects for internal decoration and use in the dwelling; fittings and furniture).

NOTICES OF MEETINGS.

SANITARY INSTITUTE OF GREAT BRITAIN.

AT the annual general meeting held at the Parkes Museum of Hygiene on May 7, Right Hon. Earl Fortescue in the chair, a report was presented by the Council on the progress of the institute, and on the work achieved at the very successful Congress and Exhibition held at Glasgow in the autumn of 1883. The Chairman of Council, Dr. A. Carpenter, gave an address, and the officers for the ensuing year were elected, the President being His Grace the Duke of Northumberland, and the trustees Sir John Lubbock, Bart., D.C.L., F.R.S., Thomas Salt, Esq., M.P., and Dr. B. W. Richardson, F.R.S.

SANITARY INSTITUTE OF GREAT BRITAIN.

EXAMINATION OF LOCAL SURVEYORS AND INSPECTORS OF NUISANCES.

AT an examination held June 5 and 6 twenty-three candidates presented themselves. The Institute's Certificate of Competency to discharge the duties of Local Surveyors was awarded to W. H. Radford, J. Bowman Wilson, Charles Gilby, W. Tattersall, and to discharge the duties of Inspectors of Nuisances, R. Gibbs, G. W. Jobbings, Kenneth Cameron, T. S. Ainge, T. Turner, R. Jeffery, J. Parker, J. Mallinson, W. A. Shadrake, W. C. Beck, T. Haslam, F. T. Poulson, J. Whyte, A. Sutcliffe, C. J. Easton (*see* page 620).

THE INSTITUTION OF CIVIL ENGINEERS.

AT the concluding meeting of this society for the Session 1883-84, held on Tuesday, May 27, Sir J. W. Bazalgette, C.B., president, in the chair, it was announced that during the session there have been elected 51 members, 214 associate members (of whom 73 were previously students), and 13 associates. In the same period 45 associate members and one associate have been transferred to the class of members and two associates to the class of associate members, whilst 171 students have been admitted. The register and lists now contain the names of 21 honorary members, 1,439 members, 1,864 associate members, 510 associates, and 778 students, making a total of 4,612 of all classes. Ten years ago the gross numbers amounted to 2,468 and twelve months back to 4,402, so that the increase in the session had been at the rate of 5 per cent.

CONFERENCES.

INTERNATIONAL HEALTH EXHIBITION, LONDON, 1884.

INTERNATIONAL CONFERENCE ON EDUCATION.

THE Executive Council of the International Health Exhibition have determined to hold an International Conference on Education in connection with the Education Division of the Exhibition. They have appointed a Committee of Management, who have drawn up the following programme. For convenience of discussion all papers to be read will be printed beforehand, and they will subsequently be published by the Executive Council.

Persons desirous of attending the Conference are invited to send in their names to Mr. R. Cowper, secretary to the Committee of Management, International Health Exhibition, South Kensington, to whom any inquiries can be addressed.

(By order) EDWARD CUNLIFFE-OWEN, *Secretary*.

COMMITTEE OF MANAGEMENT.

The Lord Reay (*chairman*); B. St. John Ackers, Esq.; Venerable Archdeacon Emery; J. G. Fitch, Esq.; Rev. Thomas Graham, D.D.; Philip Magnus, Esq.; Rev. James H. Rigg, D.D.; Rev. T. W. Sharpe; Hon. E. Lyulph Stanley, M.P.; Francis Storr, Esq., Richard Cowper, Esq. (*secretary*).

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The Conference will be opened on Monday, August 4, at 11 A.M., and will continue throughout the week. A complete programme will be issued shortly.

SUBJECTS FOR DISCUSSION.

1. *Conditions of Healthy Education.*—Under this head may be included the consideration of the structure, fitting, and equipments of a school; gymnastics, and other physical exercises; the right apportionment of time to different subjects of instruction in schools of various classes; the indirect effect of pictorial or other decoration in improving the taste and cultivating the imagination, and in increasing the scholars' interest in their work.

2. *Infant Training and Teaching.*—(*a*) Kindergarten; (*b*) Instruction generally:—Under this head may be included the right structure of schools and class-rooms for very young children; the apparatus needed for play and for instruction; the exercises, mental or manual, best fitted to awaken the faculties; the distribution of time; pictures, decoration, collections of objects, &c.

3. *Technical Teaching.*—(*a*) Science; (*b*) Art; (*c*) Handicrafts; (*d*) Agriculture; (*e*) Domestic Economy:—Under this head may be included—(*a*) Methods of teaching the different branches of physical and of natural science, the equipment of school laboratories, the value of experimental work by pupils, the organisation of evening science classes and of science schools, the connection between the teaching of pure and applied science. (*b*) The teaching of drawing and of colouring as a preparation for designing and decorative work. (*c*) The value of special and general workshop instruction in elementary, higher, and evening schools; the equipment of school workshops. (*d*) The teaching of agricultural science in elementary, in intermediate, and higher schools, in evening science classes, in special colleges, and in the universities; methods of teaching, experimental farms. (*e*) Methods of teaching cookery in schools—*e.g.* by book lessons, by demonstrative lectures, and in school kitchens.

4. *Teaching of Music in Schools.*

5. *Museums, Libraries, and other Subsidiary Aids to Instruction in connection with Schools.*—Under this head may be included the means of establishing and managing school libraries; the promotion, with the help of the scholars or otherwise, of museums of art and science illustrative of the local fauna, flora, industry, history, archæology, &c., &c.; school savings' banks; botanical and other field excursions, visits to picture galleries and museums, voluntary evening classes for singing, recitations, &c.; and generally the means of connecting the influence of the school with home life and self-improvement.

6. *Training of Teachers.*—Under this head will be considered the right professional preparation for teachers in—(*a*) Elementary, (*b*) Intermediate and Higher, (*c*) Special and Technical Schools. The relative advantages of training in special institutions and in colleges for general education; normal colleges—their constitution, conditions of admission, programme of studies; apprenticeship; model and practising schools; universities; and their relations to the training of teachers; professorships and lectureships on education; examination for diplomas and certificates; legal recognition of such diplomas and certificates; registration of teachers.

7. *Inspection and Examination of Schools.*—(*a*) By the State, (*b*) by the universities, (*c*) by other public bodies.

8. *Organisation of Elementary Education.*

9. *Organisation of Intermediate and Higher Education.*

10. *Organisation of University Education.*

11. *Systems of Public Instruction in various Countries.*

APPOINTMENTS UNDER THE PUBLIC HEALTH ACT.

MEDICAL OFFICERS OF HEALTH.

BLACK, George, M.D., has been re-appointed Medical Officer of Health for the Keswick Urban Sanitary District, at £23 for one year.

DAVIES, David, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Stapleton Urban Sanitary District, at £25 for one year, and for the Bristol Port Sanitary District, for one year (the salary for the latter included in that for the Bristol Urban Sanitary District).

DAVIES, Edward, M.D.Univ.St.And., M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Wrexham Division of the Wrexham Rural Sanitary District, at £60, for one year.

DAVISON, Rashell Thomas, M.D.Univ.Aberd., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Battle Urban Sanitary District, at £15 for one year.

DYKE, Thomas Jones, F.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Merthyr Tydfil Urban Sanitary District, at £250 per annum, for three years.

HARKER, John, L.R.C.P.Edin., M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Lancaster Port Sanitary District, for one year.

JONES, William, L.R.C.P.Lond., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Ruabon Division of the Wrexham Rural Sanitary District, at £60, for one year.

JOYCE, William, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Ashby-de-la-Zouch Urban Sanitary District, at £30 for one year.

LE TALL, Frederick Tindall, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Handsworth Urban Sanitary District, at £30 for one year.

MAILE, Charles Edmund Drayson, L.R.C.P.Edin., M.R.C.S.Eng., has been re-appointed Medical Officer of Health for the Westbury and Whorwellsdown Rural Sanitary District, Wiltshire, at £80 for one year.

MONTGOMERY, Samuel, L.R.C.P.Edin., L.R.C.S.Edin., has been re-appointed Medical Officer of Health for the Ovenden Urban Sanitary District, Yorkshire, at £25 for one year.

MUDGE, James, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Phillack Urban Sanitary District, Cornwall, at £14, for one year, as from March 25, 1884.

PALMER, Francis Craddock, L.K.Q.C.P.Irel., M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Brigg Urban Sanitary District, Lincolnshire, at £10 per annum.

ROSE, Frederick Robert, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Diss Urban Sanitary District, at £25 for one year.

SYSON, Edmund John, L.R.C.P.Edin., L.R.C.S.Edin., has been appointed Medical Officer of Health for the St. Ives, Hunts, Rural Sanitary District, at £60 per annum, *vice* the Poor Law District Medical Officers, whose appointments have expired.

WILSON, Stevenson Moreton Wightman, M.R.C.S.Eng., L.S.A.Lond., has been re-appointed Medical Officer of Health for the Lynn Port Sanitary District, for one year.

SURVEYORS, CLERKS TO GUARDIANS, INSPECTORS OF NUISANCES, &C.

ALGER, Mr. James, has been re-appointed Surveyor and Inspector of Nuisances to the Diss Local Board and Urban Sanitary Authority, Norfolk, at £40, and collector, at £20, for one year.

ALLEN, Mr. Alfred H., has been re-appointed Public Analyst for the Borough of Sheffield, for one year.

BARTLETT, Mr. John William, has been appointed Inspector of Nuisances and Sanitary Inspector to the Vestry of St. Pancras, at £90 per annum, rising to £100, *vice* Mellows.

BATEY, Mr. Edward, has been re-appointed Inspector of Nuisances for the Jarrow Urban Sanitary District, at £120 for one year.

BAYNES, Mr. James, Jun., has been re-appointed Public Analyst for the Borough of Kingston-upon-Hull, for one year.

BELLERBY, Mr. A. Thomas, District Manager, York City and County Banking Company, has been appointed Treasurer to the Winterton Local Board and Urban Sanitary Authority, *vice* Goodwin.

BENNETT, Mr. A., has been elected a Member of the Bromsgrove Local Board and Urban Sanitary Authority, *vice* Humphreys, resigned.

BURNLEY, Mr. J. J., has been appointed Accountant to the Wallasey Local Board and Urban Sanitary Authority, Cheshire, at £200 per annum, *vice* Bell, resigned.

CABBELL, Mr. Benjamin Bond, has been elected Chairman of the newly-formed Cromer Local Board and Urban Sanitary Authority for the ensuing year.

CHERRY, Mr. Arthur Charles, Banker, has been appointed Treasurer to the Upton-on-Severn Guardians and Rural Sanitary Authority, *vice* Isaac, deceased.

CLARK, Mr. J. M., has been appointed Treasurer to the Haltwhistle Guardians and Rural Sanitary Authority, Northumberland, *vice* Keen, deceased.

CLARK, Mr. William, has been elected a member of the Horsforth Local Board and Urban Sanitary Authority, Yorkshire, *vice* Benland, resigned.

CLAYTON, Mr. Edward, has been appointed Inspector of Nuisances for the Mansfield Urban Sanitary District, at £60 per annum, *vice* Goodacre, deceased.

COMBEN, Mr. Jennings, has been appointed Surveyor and Inspector of Nuisances to the Portland Local Board and Urban Sanitary Authority, at £72 per annum.

COSENS, Mr. William, has been appointed Treasurer to the Hertford Guardians and Rural Sanitary Authority, *vice* Chesshyre resigned.

CROFT, Mr. Christopher George, M.A., Solicitor, has been appointed Town Clerk and Clerk to the Urban Sanitary Authority of Richmond, Yorkshire, at £65 per annum, *vice* Tomlin, deceased.

DAVIES, Mr. Edward, has been re-appointed Inspector of Nuisances for the Ruabon Division of the Wrexham Rural Sanitary District, at £150 for one year.

DAVIES, Mr. Hugh, has been re-appointed Inspector of Nuisances for the Wrexham Division of the Wrexham Rural Sanitary District, at £150 for one year.

DOWNEY, Mr. Daniel, has been appointed Accountant to the West Hartlepool Improvement Commissioners and Urban Sanitary Authority, at £165 per annum.

DYSON, Mr. James, has been elected a Member of the Barkisland Local Board and Urban Sanitary Authority, *vice* Hanson, resigned.

GOULD, Mr. W. H., has been appointed Surveyor to the Ilfracombe Local Board and Urban Sanitary Authority, at £60 per annum, *vice* Pile.

HALL, Mr. John, has been re-appointed Inspector of Nuisances for the Lynn Port Sanitary District, for one year.

HAWKINS, Mr. Edward Charles, Branch Manager of the London and County Banking Company, has been appointed Treasurer to the Urban Sanitary Authority of Sandwich, *vice* Cottew, resigned.

HEARD, Mr. Herbert, has been elected a Member of the Shepton Mallet Local Board and Urban Sanitary Authority, *vice* Hickes, resigned.

HEARNE, Mr. William, has been appointed an Inspector of Nuisances for the Parish of Paddington, at £120 per annum, *vice* Clifford, resigned.

HEY, Mr. John, has been elected a Member of the Thornton Local Board and Urban Sanitary Authority, Yorkshire, *vice* Dobson, deceased.

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HILTON, Mr. Franklin, has been elected Chairman of the newly-formed Eston Local Board and Urban Sanitary Authority.

HOLLAND, Mr. William Henry, has been re-appointed Surveyor and Collector to the Cirencester Local Board and Urban Sanitary Authority, at £130 for one year.

HOWLAND, Mr. Henry, has been appointed Surveyor and Inspector of Nuisances to the Thame Local Board and Urban Sanitary Authority, at £60 per annum, *vice* Mr. William W. Howland, his brother, resigned.

HOWSE, Mr. Henry, has been re-appointed Inspector of Nuisances for the Aylesbury Urban Sanitary District for three months, at the same rate of salary as before.

HUMPHRIES, Mr. Josiah, has been re-appointed Treasurer to the Diss Local Board and Urban Sanitary Authority, for one year.

HUNT, Mr. George J., has been appointed Collector to the Corporation and Urban Sanitary Authority of Chepping Wycombe, Bucks, at £55 per annum, *vice* Organ, deceased.

HUNTER, Mr. Robert Naisbitt, has been appointed Surveyor and Inspector of Nuisances to the Oswaldtwistle Local Board and Urban Sanitary Authority, at £125 per annum, *vice* Hall, resigned.

ISAAC, Mr. John Swinton, Banker, has been appointed Treasurer to the Martley Guardians and Rural Sanitary Authority, *vice* Mr. John Whitmore Isaac, his father, deceased.

JAMES, Mr. H. E., has been elected a member of the East Stonehouse Local Board and Urban Sanitary Authority, Devonshire, *vice* de Courcy, resigned.

JONES, Mr. Benjamin Cledan, has been appointed Clerk to the Aberayron Guardians and Rural Sanitary Authority, Cardiganshire, at £50 per annum as Clerk to the Guardians, £12 per annum as Clerk to the Rural Sanitary Authority, £10 per annum as Clerk to the Assessment Committee, £35 per annum as Clerk to the School Attendance Committee, and fees as Returning Officer and Superintendent Registrar of Births, &c., *vice* Mr. John Jones, resigned.

LAYCOCK, Mr. Thomas W., has been appointed Surveyor to the Walker Local Board and Urban Sanitary Authority, Northumberland, at £120 per annum, *vice* Wharrier, resigned.

LOACH, Mr. Edwin, has been elected a Member of the Workington Local Board and Urban Sanitary Authority, *vice* Whitfield.

LYUS, Mr. Henry Ormiston, Solicitor, has been re-appointed Clerk to the Diss Local Board and Urban Sanitary Authority, at £30 for one year.

MARTEN, Mr. H. J., has been appointed Assistant Surveyor to the Corporation and Urban Sanitary Authority of Bradford, at £200, rising to £250 per annum, for six years.

NICHOLL, Mr. Joseph, has been re-appointed Inspector of Nuisances for the Ovenden Urban Sanitary District, at £30 for one year.

PAYBODY, Mr. George, has been elected a Member of the Shanklin Local Board and Urban Sanitary Authority, *vice* Knighton, resigned.

RANDALL, Mr. H., has been appointed Inspector of Meat and Slaughter Houses for the City of London, at £150 per annum.

ROBERTS, Mr. Richard, has been elected a Member of the Rastrick Local Board and Urban Sanitary Authority, *vice* Kaye, deceased.

SALISBURY, Mr. J., has been re-appointed Inspector of Nuisances for the Ashby-de-la-Zouch Urban Sanitary District, at £30 for one year.

SIMPSON, Mr. Higson, Solicitor, has been appointed Clerk to the West Hartlepool Improvement Commissioners and Urban Sanitary Authority, at £200 per annum, *vice* Brunton, resigned from pressure of other business, after thirty years' service.

SMITH, Mr. Isaac, has been re-appointed Inspector of Nuisances for the Lancaster Port Sanitary District for one year.

STINSON, Mr. William, has been elected a member of the Whitwick Local Board and Urban Sanitary Authority, *vice* Shaw.

SUMMERFIELD, Mr. F. W., has been elected a Member of the Heath Town Local Board and Urban Sanitary Authority, *vice* Gilmer, resigned.

SUTTON, Mr. Francis, has been re-appointed Public Analyst for the County of Norfolk, for one year.

SWORDER, Mr. Herbert, has been elected a Member of the Bishop Stortford Local Board and Urban Sanitary Authority, *vice* Mr. G. E. Sworder, his father, deceased.

THOMAS, Mr. Thomas, has been elected a Member of the Hebden Bridge Local Board and Urban Sanitary Authority, Yorkshire, *vice* Barker, resigned.

TOWNSEND, Mr. H., has been appointed Gas and Water Manager to the Corporation and Urban Sanitary Authority of Dewsbury, at £200 per annum, with house, &c.

TOZER, Mr. James, has been re-appointed Inspector of Nuisances for the Crediton Urban Sanitary District, at £12 for the ensuing year.

VALLANCE, Mr. Robert Frank, has been appointed Surveyor to the Mansfield Improvement Commissioners and Urban Sanitary Authority, at £150 per annum, *vice* Goodacre, deceased.

WADDINGTON, Mr. Isaac, has been appointed Collector to the Clayton Local Board and Urban Sanitary Authority, Yorkshire, at £26 per annum, *vice* Ashton, resigned.

WADSWORTH, Mr. Alexander, has been elected a member of the Greetland Local Board and Urban Sanitary Authority, Yorkshire, *vice* Fielding, resigned.

WAKELAM, Mr. Henry Peter, C.E., has been appointed Surveyor and Inspector of Nuisances to the Corporation and Urban Sanitary Authority of Chepping Wycombe, Bucks, at £150 per annum, *vice* Organ, deceased.

WALLIS, Mr. Henry Ellis, has been elected a Member of the Hove Board of Improvement Commissioners and Urban Sanitary Authority, *vice* Dawson.

WALTER, Mr. Nimrod, has been appointed Inspector of Nuisances for the Reigate Urban Sanitary District, at £75 per annum, *vice* Apted, resigned.

WARDE, Mr. Joseph, has been re-appointed Inspector of Nuisances for the Wilsden Urban Sanitary District, Yorkshire, at £57 for one year.

WEST, Mr. William Washington, has been appointed Assistant Inspector of Nuisances for the Walthamstow Urban Sanitary District, at £80 per annum.

WHITEHEAD, Mr. James, jun., has been re-appointed Inspector of Nuisances for the Rawmarsh Urban Sanitary District, Yorkshire, at £60 for one year.

WILLIAMS, Mr. John, has been re-appointed Inspector of Nuisances for the Cirencester Urban Sanitary District, at £50 per annum.

YEO, Mr. Isaac, has been re-appointed Inspector of Nuisances for the Okehampton Rural Sanitary District, at £55 for one year.

VACANCIES.

MEDICAL OFFICER OF HEALTH, PUBLIC ANALYST, and GAS EXAMINER for the Parish of Chelsea. £450 per annum. Application, 17th inst., to J. Eisdell Salway, Vestry Clerk, King's Road, Chelsea.

MEDICAL OFFICER OF HEALTH for the Woodbridge Rural Sanitary District.

MEDICAL OFFICER OF HEALTH for the Ormskirk Rural Sanitary District.

MEDICAL OFFICER OF HEALTH for the Maryport Urban Sanitary District.

SURVEYOR AND INSPECTOR OF NUISANCES to the Corporation and Urban Sanitary Authority of Oswestry. £150 per annum. Application, 17th inst., to J. Parry Jones, Town Clerk.

SURVEYOR AND INSPECTOR OF NUISANCES to the Corporation and Urban Sanitary Authority of Ripon.

SURVEYOR to the Newbold and Dunston Local Board and Urban Sanitary Authority.

INSPECTOR OF NUISANCES for the Doncaster Rural Sanitary District.

COLLECTOR to the Wednesbury Local Board and Urban Sanitary Authority. £130 per annum.

COLLECTOR to the West Hartlepool Improvement Commissioners and Urban Sanitary Authority. £125 per annum.

LOCAL INTELLIGENCE.

TESTIMONIAL TO DR. TAYLERSON.—A testimonial was presented to Dr. Taylerson, of Whitby who has been obliged to resign his appointment on account of ill-health) on the 27th ult. The following address, beautifully illuminated on vellum in gold and colours by Messrs. Waterlow, of London, was read by Mr. John Stevenson, chairman of the Local Board:—"The friends and fellow-townsmen of John Taylerson, Esq., L.R.C.P. Edinbro', M.R.C.S. England, L.S.A., desire his acceptance of a purse of gold as some token of their esteem and respect, and in recognition of the efficient services which during a long life he has rendered in various official and public capacities, including those of Medical Officer of the Whitby Poor Law Union, Medical Officer of Health to the Whitby Urban and Rural Sanitary Authorities, Chairman of the Burial Board, and Surgeon to the Whitby Public Dispensary. Whitby, May 1884." Mr. J. Stevenson said he could assure the doctor that it gave him the greatest pleasure to hand over to him the purse of gold and the address he had read, as a slight mark of the esteem in which he was held. No one could do it with more sincerity than he could; in their early days they were pupils of the same firm, and they had passed through life as friends. The address only spoke of some of the offices Dr. Taylerson had held; others might have been named; and in all he had earned the esteem of his townsmen and rendered himself worthy of the tribute which was now paid to him. In replying, Dr. Taylerson, who was labouring under great emotion, said it had been his constant endeavour to discharge his duty in all the offices he had held. As to the public institutions with which he had long been connected, he could truly say he had earnestly sought to promote their success. Some of these were now in a much better state than when he first knew them. The workhouse was wonderfully improved; he remembered the time when lunatics were chained to the walls, or kept in pens like wild beasts, but he had always desired that lunatics should be treated in a more humane manner, and things were very different now.

Eston, Yorkshire, has been constituted a Local Government District with a Board of twelve members. The following have been elected, viz.: Messrs. John Anderson, Elisha Beacham, William Dale, Allan Harker, Alfred Clayton Hill, Franklin Hilton (chairman), John George Kent, Thomas Medd, John Mills, William Seymour, John Thomson, Thomas Williams.

Mr. Arthur Birks, who has been elected Chairman of the Fenton Local Board and Urban Sanitary Authority for the third time, has been entertained at a complimentary dinner at the Public Hall. Mr. F. W. Grove, ex-chairman, presided, supported by several members of the Board, the Mayor of Longton, and several influential residents of the town and neighbourhood.

The Clutton Guardians and Rural Sanitary Authority have been invested with the powers, rights, &c., of an Urban Sanitary Authority, under Sect. 169, Pars. 2 and 3, and Sect. 170 of the Public Health Act, 1875 (the regulation of slaughter-houses), within the contributory places of Chew Magna, Chilcompton, Clutton, Farmborough, High Littleton with Hallatrow, Paulton, Publow, Stanton Drew, Timsbury, and West Harptree.

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The Local Government Board have, in answer to a petition from owners and ratepayers, intimated their willingness to settle the boundaries of a place, being part of the Parish of Chertsey, with a view to the formation of a Local Government District, and requesting to be furnished with the name of a suitable person to act as summoning officer.

The Kendal Town Council and Urban Sanitary Authority have increased the salary of Mr. Christopher Graham, the treasurer, £20 a year, owing to the great increase in the duties of his office.

The portrait of Mr. Thomas Swainson, the Town Clerk and Clerk to the Urban Sanitary Authority of Lancaster, has been painted and presented to the Corporation, and hung in the Town Hall, in recognition of his official services and the fidelity with which he has served his native town (especially in regard to the important sanitary works and other improvements), and the personal respect and esteem of the subscribers.

The Lancaster Town Council and Urban Sanitary Authority have increased the salary of Mr. Isaac Smith, the Inspector of Nuisances, £10 per annum.

There were 103 candidates for the appointment of Surveyor and Inspector of Nuisances to the Chepping Wycombe Urban Sanitary Authority, at £150 per annum.

The Oswestry Urban Sanitary Authority, on appointing a Surveyor and Inspector of Nuisances only about a year ago, reduced the salary to £130 per annum; but the offices being again vacant in consequence of Mr. Wakelam having been appointed to Chepping Wycombe they have increased it to £150 per annum, having arrived at the conclusion that it is quite impossible to retain the services of a competent man for less.

There were 140 candidates for the Surveyorship to the Toxteth Park Urban Sanitary Authority, at £350 per annum.

The Ormskirk Rural Medical Officers of Health Appointments expire on the 24th inst., in anticipation of which the Local Government Board had an inquiry made by Dr. Parsons, one of their medical officers. They sent his report to the authority with a letter stating that the inquiry was undertaken mainly with a view to the Board's ascertaining how the several medical officers of health, to whose reappointment they, under the circumstances, assented until June 24, had performed their duties. In transmitting the copies of the report they had to state that the result of the investigation was such as to lead the Board to the conclusion that, in none of the divisions had the duties which devolved upon medical officers of health under the Board's order and instructions been carried out in as efficient a manner as the sanitary interests of the locality required. In one district only (Mr. Wood's) had anything approaching to the Board's requirements been attempted. It further appeared that there had been an absence of that personal conference between the officers and the authority which was requisite, but that was probably due to a great extent to the fact of the officers being so many in number. Having regard to these conclusions, the Board were unable to avoid the conclusion that the present arrangements for the discharge of the important duties of the office of medical officer of health were unsatisfactory, and that after June 24 one efficient officer should be appointed for the whole district at an adequate salary. The Board further pointed out the deficient water supply in several parts of the districts, the risk of contamination of the water, and the nuisances arising from faultily-constructed and ill-scavenged middens and privies.

The Chesterfield Rural Sanitary Authority recently re-appointed Dr. Mackintosh as medical officer of health, but reduced his salary from £400 to £350 per annum. At the last meeting of the Authority a letter was read from the Local Government Board stating that they were strongly of opinion that it was very undesirable to reduce the salary. The Board believed that the duties had been discharged with much zeal and efficiency, and it would naturally be a great discouragement to an officer, after a long period of service, to have his salary reduced. The population of the district had largely increased since the amount was fixed, and the Board saw no reason to believe that it was more than adequate for the duties performed. They therefore asked that the Authority would reconsider the matter, and trusted that they would not adhere to the proposal to decrease the salary. In the discussion which ensued it was stated that Dr. Mackintosh had formerly to devote the whole of his time to the Rural Authority, but he was now allowed to hold office under the various urban authorities in the district, and to receive a salary from each, which amounted altogether to £150/. per annum, making, with the £350 proposed to be paid by the Rural Authority, £500 per annum, the amount originally fixed. Upon the motion of the Chairman, seconded by Mr. Berry, a resolution was then passed that the Authority saw no reason to alter their previous decision.

The Thornhill comedy mentioned in our last (p. 574) terminated somewhat tragically. At the next meeting, all the members attended as before, and both sides being obdurate, no chairman could be appointed, and consequently no business transacted. The sitting commenced on Monday evening and continued until Wednesday afternoon, the members sleeping on the Board-room floor at night, and being supplied with refreshment from home. On Tuesday Mr. Hodgson, one of the members, had a message informing him that his wife was dangerously ill, upon which he paired with one of the opposing party to enable him to go home and see her; but after a short time, as she appeared to be getting better, he returned to the Board room On the Wednesday afternoon, however, he received an urgent message, that if he wished to see his wife alive, he must go home forthwith. He then tried to pair again; but the opposing party all refused, the result being, that after a great deal of recrimination, he and his party left the room in a body; upon which Mr. Fisher was appointed chairman, and the various committees were appointed. When Mr. Hodgson reached home, he was shocked to find that his wife was dead.

SANITARY INSTITUTE OF GREAT BRITAIN.

EXAMINATION OF LOCAL SURVEYORS. June 5, 1884.

Paper I.—1. What public laws exist as to the construction of new houses and buildings in respect of height, thickness of walls, general curtilage, and out-buildings? What legal powers can a local surveyor use to compel the laying on of a proper supply of water? In the event of his reporting to his authority that entry for this purpose has been refused, how would he substantiate his report before the magistrate? Describe the powers exercisable by the surveyor of a local, authority with respect to ventilation of—(a) Building, dwelling-houses and manufactories; (b) sewers, private and public. What provisions ought to exist to carry out ventilation in each of these? 4. How would you calculate the dimensions of an outfall sewer for a population of 15,000 people, the ground affording a gradient of 1 in 600? 5. Under what circumstances would you adopt a glazed earthenware pipe sewer in preference to one of brick? How would you form a brick sewer in a running quicksand at a depth of, say, 12 feet. 6. Sketch a ventilating chamber and a manhole, and also a means of flushing a pipe sewer.

Paper II.—1. Supposing that a new water supply is needed for your district, how would you ascertain the sufficiency or otherwise of any adjacent brook or river to supply the necessary quantity? 2. What is meant by hard water? What sources usually furnish it? and what is meant by total hardness and by permanent hardness? 3. What are the most common causes of pollution of water in wells, in water butts, and in cisterns inside houses? and what steps would you take to prevent pollution in each case? 4. What amount of fresh air must be supplied per hour for each individual for health? To what extent and in what manner does the quantity depend on the size of the room in relation to the number of occupants? Explain by one example how your result is arrived at. 5. Draw up a short set of by-laws for the proper management of a common lodging-house. 6. Describe the manner in which you would construct a macadamised road upon newly-filled-up ground. Give sketches of the construction of a macadamised road, and show the form of the surface and the falls from crown to channel.

EXAMINATION OF INSPECTORS OF NUISANCES. June 5, 1884.

1. State the powers of local authorities in regard to dealing with infectious diseases. 2. What is the order of procedure prescribed by the sale of Food and Drugs Act in obtaining for analysis samples of articles suspected of being adulterated? 3. What is a cellar dwelling? Under what conditions may underground rooms be inhabited? 4. What are the characteristics upon which you would decide whether a sample of water should be submitted to the analyst, or not? 5. How is cubic space calculated, and how much ought to be given for an adult? What is the amount of cubic space usually required for common lodging-houses? 6. A nuisance having been reported to exist in a certain house, what steps would you take? What is meant by a recurring order? 7. In the inspection of a slaughter-house, to what points would you specially direct your attention? What are the requirements of a properly constructed slaughter-house? 8. Describe how you would proceed to investigate defects in a system of house drainage, and make a short report upon supposed defects in a house of, say, £50 rental, with especial reference to the points which more usually are found to prevail.

NOTES AND QUERIES.

Having for some time back been in the receipt of Queries appertaining strictly to sanitary work, and which it would be easy to answer, without having to refer our correspondent to competent professional advisers, we have opened a column in which to register such Queries and Replies thereto as can fairly be expected from us; and our subscribers and readers are invited to make such use of this column as will tend to benefit themselves and the community. Both Queries and Replies will, however, be subjected, if unnecessarily long, to a strict curtailment.

123. INFECTIOUS HOSPITALS.

Can you give me any information of a kind likely to be of assistance in preparing a code of rules for the management of an infectious hospital? 'MEDICO.'

[The Tenth Annual Report of the Local Government Board on the Use and Influence of Hospitals for Infectious Disease contains much valuable information on the subject. In the Appendix (p. 295) there is a copy of the rules issued by the Metropolitan Asylums Board for regulating the visiting of patients. A more extensive code has been issued by the Board, a copy of which could doubtless be obtained on application. Dr. Wilson, in his Handbook of Hygiene, gives the rules drawn up by him for the Solihull Infectious Hospital, and Mr. A. C. Munro, the Medical Officer of Health of South Shields, has appended to a recent report the instructions in force for the hospital in that borough.]

124. THE POLLUTION OF RIVERS.

Can you or any of your readers refer me to the particulars of any case under the Pollution of Rivers Act, where proceedings have been taken against a firm of tanners for pollution of a running stream by the liquids discharged from their works? SANITARIAN.

[We have not been able to find particulars of any such proceedings.—ED.]

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